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AUTOMOTIVE INDUSTRIES
VOLUME 55 *Philadelphia, Thursday, July 1, 1926* NUMBER 1

Industry Goes Into Last Half of Year With Business Holding Firm

Sales of cars and trucks still at high levels. Recession predicted in some quarters fails to materialize. June turnover far ahead of last year.

ABOUT a year ago a group of religious fanatics feverishly awaited the end of the world in a hut on Long Island. Through the night they prayed and sang, but when the cold, gray dawn came the milk men were going their customary rounds, the commuters were running for their trains and the newspapers were printing sarcastic stories about the Prophet of Doom. Business as usual!

The automotive industry has just passed through a similar hour, the coming of which was watched with nervous uncertainty by numerous economic prophets, many of them with a sound record for good guessing in the past.

The dire things that these prophets predicted might happen to business during the months of July to December are scheduled for appearance now. Yet here we are going to press after twenty-four hours of these last six months have passed and the only thing that can be said about conditions today and about the prospects for the rest of the year is the same thing which was said about the religious vigil already referred to—business as usual!

Even a confirmed pessimist must not only admit but insist that automotive business prospects for the last six months of 1926 look far more encouraging at the present than was predicted by a good many of us six months ago. While the period of production record-breaking probably has passed for the rest of this year, and while the last six months may result in slightly smaller volume than the first six, there are no new clouds in the business sky—and some clouds which were there a few months ago are not so threatening as they once were.

As we go into July, reports of retail sales from all over the country are almost unanimous in stating that June sales, while less than those of May, were well ahead of June, 1925. Some places report as high as 50 to 100 per cent better sales in June this year than in June, 1925, although these large gains are not at all typical. The average probably is somewhere around 10 to 20 per cent. There is still plenty of credit available at relatively low rates. The agricultural situation gives promise of continued improvement and business leaders generally are proceeding on so conservative a basis as to make anything like an important depression extremely unlikely, if not impossible, at this time.

Used cars, the danger spot in the automotive merchandising scheme for several months, are no worse than for several months past. In some place a very considerable improvement both in stocks and rate of used car sales is reported, as a matter of fact. Retail financing terms have had a marked turn toward conservatism in the last few months and the capital supplying funds for automotive instalment buying seems finally to have sowed most of its wild oats.

The last half of 1926 has arrived. Rather a cheerful looking newcomer after all, bearing none of the signs of depression which so many feared and talked about

Truck sales are moving along at a satisfactory pace in almost every section of the country and give promise to continue without material decrease throughout the rest of the year.

So it looks as though automotive executives could shine up their golf clubs and take their 1926 vacations without undue concern about dire economic happenings during their absence.

The outlook for the last six months is for reasonably steady retail sales, steady consumption of

As We Enter the Last Six Months of 1926—

NEW car sales in June were less than in May this year.

New car sales in June were ahead of those in June, 1925.

Used car sales have been more brisk recently and stocks are somewhat reduced in a number of places. The situation still is rather unfavorable, however, and dealer profits from used cars have been unsatisfactory.

Retail financing of new cars is definitely on a more conservative basis than it was eight months ago.

Financing rates on used cars are being held to more conservative rather than more liberal limits than they were eight months ago. While this has tended to improve conditions fundamentally, it hasn't made it any easier for dealers to move used car stocks.

Credit is readily available at reasonable rates, business executives are going ahead conservatively, general business continues to go forward on an even keel and there is every indication of steady, although probably not record-breaking, automotive production and profits throughout the year.

factory production so long as schedules are held down to reasonable levels and good, although not record-breaking, profits throughout the industry.

Obviously this prosperity will not be evenly distributed. The first six months show clearly that even during that record-breaking period for the industry as a whole some companies have gone forward at the expense of others. It is interesting to note, however, that the gainers have not in every case been those whose names are most familiar to the public at large.

June Output Below May

While production guesses are extremely hard to make these days, it seems certain that June output was below that of May. In June, 1925, the total of cars and trucks built was about 402,000 and it seems likely that the June total this year was somewhere near that figure.

The big drop in output last year came in August, when only 259,000 vehicles were built as against 400,000 the month before. Whether so great a decline will come in August this year remains to be seen. Present indications are that the June and July decline may be sufficient to necessitate only a slightly greater slowing down in August.

Reports from the field this year refer less than ever before to any hold up in purchasing because of waiting for new models to come out. The new models, while they tend to stimulate sales when they do appear, no longer seem to be having the deterring effect on buying that they once had. As the automobile becomes more and more an integral part of our social life, buying tends to become more continuous and less influenced by seasonal considerations.

While prospects do look unusually good for this time of year, the condition of the used car market still must not be viewed too optimistically. Sales of used vehicles have improved in the last four weeks without question, but the dealers are not making profits from the sales, by and large, and large stocks still remain on hand in many places.

Distributors and dealers are likely to get so enthusiastic talking about new car sales that they fail to register the importance of their used car situation unless a special investigation is made into this field. One Philadelphia distributor, for example, told the writer how booming his business is at present, pointed out his great difficulty in getting cars from the factory and was very optimistic about the future. Finally he was asked "How about used cars?" He simply threw up his hands and said "Oh my. They certainly aren't moving well. Used cars are a terrible problem." A somewhat similar instance took place in interviewing a big Pittsburgh distributor lately. They don't talk about used cars so much, perhaps, because they have come to accept a bad used car condition as permanent; but the troubles are there with them just the same.

Reports on Used Car Situation

An idea of how used car affairs are shaping up is given by reports from various cities on this subject. Baltimore, for example, reports that "used car stocks are about normal, but there are more used cars on hand than many would like to see." Used car conditions in New York City are very good, according to Harry Bragg, general manager of the local dealers' association, but Minneapolis says that used car sales are slow. In New Orleans it is said, "the used car department has suffered a slight depression, but practically all dealers report used cars in better shape than at the same time last year." Used cars selling for $750 or more are reported to be moving fairly well in the Berkeley, California, district, but cheaper cars sold "as is"' are not moving. The used car business in Chicago still suffers, according to our report, from shoppers who will buy cars from the dealer who offers the best terms for the old car, but Salt Lake City reports that "used car stocks are concentrated in fewer hands than usual and the outlook for business generally is regarded as very good."

Thus it appears clear that, while the coming of good weather has temporarily made the used car situation a bit removed from the acute stage, there is still little reason for anything like great optimism on this score.

Following are brief summaries of present business conditions in the principal trading areas of the country, as reported by correspondents of *Automotive Industries*:

BALTIMORE

SALES of new cars in the Baltimore territory during June declined somewhat from the total of the previous month, considering the trade as a whole. However, the month was better than the same period of last year. Recent price reductions on some cars and announcement of the coming of some new models are held to be responsible for holding back the demand somewhat. These things have had the tendency to keep conditions rather unsettled. The dealers generally, however, are optimistic in regard to immediate future business.

General business conditions in the Baltimore territory are good. Although crop conditions in the rural sections are good, they are rather late, due to cool weather. Considerable uneasiness also was felt during a part of June because of the lack of rain. This has been relieved now, however.

Used car stocks are reported about normal but there are a few more used cars on hand than many would like to see.

The accessories business is moving along at about its

normal rate for this season of the year.

June brought about some decline in the truck demand in the Baltimore territory when the month is compared to May. Like the passenger car business, however, the demand was better than during June of last year and the total business for the first six months exceeds that of the corresponding period of 1925.

COLUMBUS, O.

DECIDED increase in sales of new cars was reported during the month of June by a large majority of dealers and distributors. Business is about 10 per cent ahead of that for the month of May.

Some of the dealers report a rather spotty demand, however. This is especially true of the higher priced cars which are not showing as large a percentage of increase as the more popular priced jobs. The greatest increase in sales is reported on cars ranging in price between $600 and $1800. Quite a few sales of higher priced cars were reported during the month, however.

While farmers as a rule are not prospering to any great extent, there is a better feeling in agricultural sections since weather conditions have improved. Prospects for crops, especially wheat, are good and this is causing farmers to look around for new cars.

The most marked improvement, however, has been in the used car trade. Dealers who had accumulated a large number of used cars from trades made earlier in the season have reduced their stocks materially and in some cases are pretty well cleaned up.

ST. LOUIS

SALES of new automobiles during June showed an improvement over sales of May and compare favorably with sales during June of 1925. The usual tendency at this time of the year on the part of prospects to wait for new

The Last Six Months as Viewed by Association Executives

ALFRED REEVES, General Manager, National Automobile Chamber of Commerce—Business prospects for the last half of the year are better today than they seemed at any preceding period during the year. During the first quarter many felt that general business was likely to show a softening and that the production of motor factories would continue to go ahead too rapidly for the selling program, with the result that there would be a considerable shut down in the final six months.

Neither of these situations has developed, however, in the way that some expected.

The policy of the manufacturers has been sane and conservative. When the market started to sag, some large producers adjusted their schedules accordingly, with the result that slack was soon taken up and they started resumption of business early in the summer with a busy program for the remainder of the year.

It is reasonable to expect good business when allowance is made for the seasonal trend, and economic authorities seem to concur in the view that the fall months will register renewed business activity.

M. L. HEMINWAY, General Manager, Motor and Accessory Manufacturers Association—The automotive parts and accessory business has entered upon the second half of 1926 with confidence born of its greatest and, in some respects, most successful six months' operation.

The first half of the year closed with a recorded dollar volume of business between 15 and 20 per cent in excess of the first six months of 1925 and with a gain of 25 to 30 per cent in unit production. The industry hardly expects to maintain output at this high level for the rest of the year, but present indications promise a good business throughout summer and fall, most likely equalling or even exceeding that of the last half of last year.

Members of the Motor and Accessory Manufacturers Association make semi-finished material, units, parts and accessories for original equipment of cars, trucks and other automotive vehicles. They also make parts for replacement and accessories for additional equipment as well as varied lines of machinery and tools for the automotive service station. A large representation of the Association's membership, recently replying to a questionnaire on future business, stated expectations for the third quarter considerably in excess of the similar three months of 1925. Anticipated gains ranged all the way from 5 to 25 per cent, and while a few manufacturers looked for a decline in volume, they were a small minority.

The industry's principal problem is low prices and small profit margins growing out of excessive production facilities and consequent over-zealous competition in a good many lines.

E. P. CHALFANT, Executive Vice-President, National Standard Parts Association—A survey of the industry for the past six months, discloses a very satisfactory condition, one which bespeaks growth and stability. Business volume has shown satisfactory increases, with all indication of maintaining the increase for the balance of the year, and car manufacturers are continuing to produce automobiles in the millions, each one of which will require replacement parts after a period of use.

WILLIAM M. WEBSTER, Commissioner, Automotive Equipment Association—The automotive equipment business for the first six months has been good and is getting better every month. This opinion was voiced by jobbers from all sections of the country who attended the convention of the Automotive Equipment Association at Montreal last week.

The demand for accessories, supplies, tools, parts and shop equipment showed an improvement in June. Optimism was the keynote of the A.E.A. convention and manufacturers and jobbers alike were so firmly convinced that the market would continue to expand that several sessions were devoted to the discussion of methods to keep pace with the market and better serve the motoring public.

car announcements is beginning to be apparent and is not helpful.

Used cars are moving better now that the vacation season is in full sway and stocks have been reduced so that there are no dealers complaining of being loaded with them.

Trucks are selling about as well as expected. During June truck sales showed a gain both over May of this year and June, 1925.

CLEVELAND

MANUFACTURE and sale of automobiles in Cleveland during the month of June maintained a pace that was both steady and lucrative.

This is indicated by reports from various of the city car makers, distributors and dealers. The car output, while satisfactory, is not believed to have been any greater than the production mark set in June, 1925, and perhaps not quite so large as the output of May this year. Stocks of both manufacturers and distributors and dealers are of normal size.

Used car sales were heavy throughout May and continued big through the first two weeks of June, but the past 15 days has seen a noticeable let up.

Tire and accessory sales were unusually heavy.

MINNEAPOLIS

THE automobile business in this territory continues at a fast pace. For three weeks in June there was a slump but delayed rains have produced better general feeling. Sales are somewhat better than in May. Deliveries are still behind orders in many lines.

What effect the crop will have on sales is a problem, and will be until a definite forecast is made. However, general business gauged by checks through banks is a few per cent under 1925. Branch managers are rather enthusiastic over the summer sales prospect as they see it now.

Used car sales are slow and accessories are not moving at more than ordinary rate.

The outlook for truck sales is not good, due to the crop situation in parts of the Dakotas. Also, the 1926 state highway tax of 10 per cent list on trucks for commercial use as compared with only 2.4 per cent in the case of farm used trucks has cut down commercial trucking profits. Used trucks are not moving, largely because of the discriminatory tax.

BIRMINGHAM

REPORTS from local automobile dealers and accessory men continue to be optimistic notwithstanding the fact that business seems to have slowed up some in other parts of the country.

Compared with June of last year, the dealers say that business had increased in some lines as much as 50 per cent. It has also shown a gain over last month and last month was reported to be an exceptionally good one. The largest gains in sales have been reported by the dealers in the cheaper cars but those handling the more expensive makes also reported substantial increases.

Accessories men, tire and repair men, and oil and gasoline men are unanimous in proclaiming this June the best month so far in Birmingham. There is a steady demand, they say, for all things automotive, including service.

Credit conditions are good. There have been practically no re-possessions on the new cars and very few on the used cars.

Truck dealers report continued good business in and around Birmingham. This June was better than June, 1925, by a long lead, and showed a slight improvement over the business done in May of this year.

MILWAUKEE

THE remarkable pickup in retail passenger car business which started right after May 1 and caused May to set a new high record has not suffered much reaction, and it is deemed certain that June will produce fully 12,000 sales, to compare with 8755 new cars placed in Wisconsin in June, 1925. May sales were 21,093 cars, compared with 13,238 in May, 1925, a gain of 7855, or approximately 60 per cent.

Opinion is that business should be steadily active at least until Oct. 1. Underlying conditions are improving. Business sentiment is much better than when the stock market slump caused apprehension. Industries are booking larger business. Employment is increasing once more after running into a slump late in March. In Milwaukee, payrolls are 7 per cent in excess of a year ago, although about 2.8 per cent below the 1926 peak reached in February. Wages are stationary and the labor situation is serene. Rents are easier although not sliding. Dwelling construction is going ahead nicely.

Truck business in Milwaukee county is relatively excellent, and this may be said of the entire field—from the ¾-ton to the 5-ton vehicle.

NEW YORK

WITH general business conditions continuing good, new car sales in June throughout the metropolitan territory show only a seasonal decline from the spring peak, but continue to run considerably ahead of the same period for 1925.

Distributors and dealers believe that 1926 will be a banner year for the trade in this district.

During the first two weeks in June 6585 new cars were sold, compared with 7664 in the first two weeks of May this year; 5250 in the first two weeks of June last year, and 10,162 for all of last June.

The complete figures for June are expected to be well ahead of this month in 1925, although less than for May, 1926.

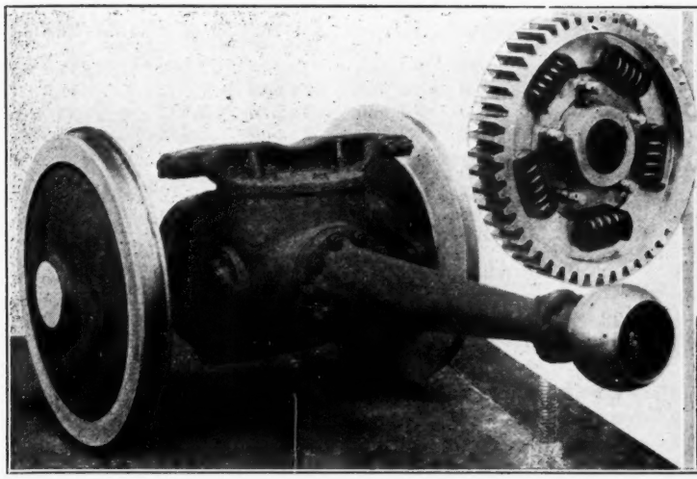
The used car situation is in better condition than at any previous time in some years. Several companies are conducting special used car sales but not worrying about disposing of their used-car stocks by the time the new models arrive.

Truck sales in this district continue strong, and most dealers agree that the truck business never has been in better condition.

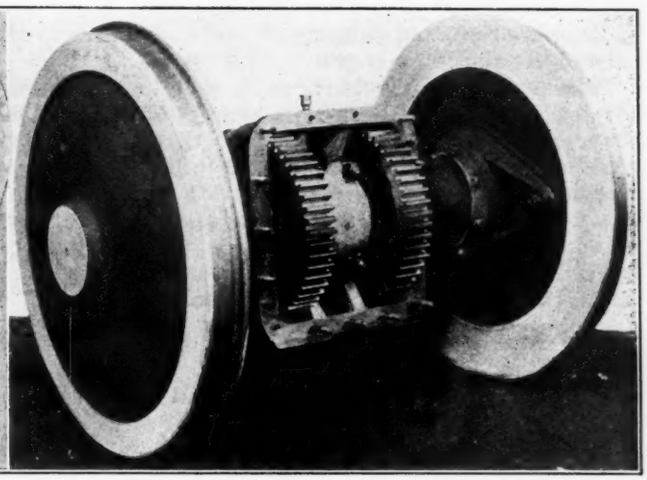
BOSTON

MOTOR car sales started to slide backward in June rather early in the month. May registrations had shown a 16,000 increase over a year ago and the impetus of the sales went along about into the first third of this month. Then the tapering off began. It was not expected and it hit all but a few lines. However, as some dealers up to early June had sold as many cars as they had done in seven or eight months last year, they were not worried. But other distributors began to get anxious. They can

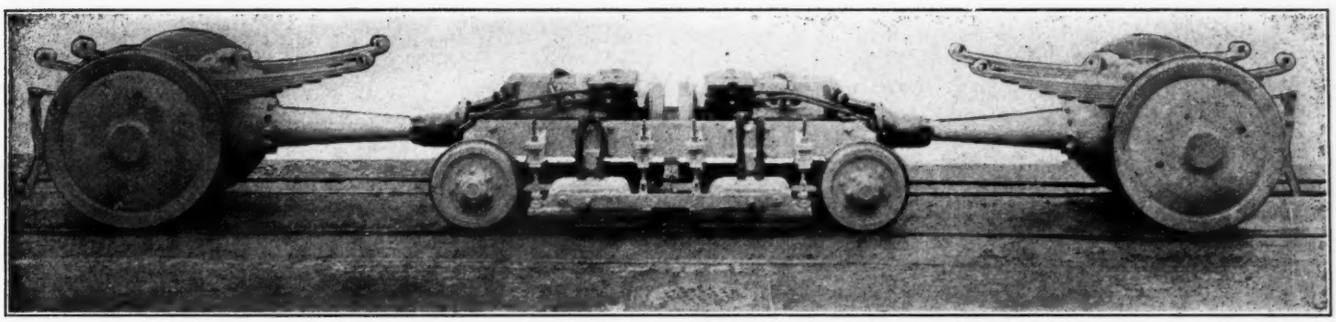
(Turn to page 37, please)



Driving axle unit and cushioned drive gear of new Swiss railcar



Driving axle with cover removed, showing double-gear drive



Underframe of eight-wheeled railcar of Swiss Locomotive Works

New Type of Underframe Allows Rail Cars to Negotiate Sharp Curves

Has shaft drive to front and rear axles. No differential gear used. Developed by Swiss firm.

A NEW truck or underframe for street cars and rail cars has been developed by the Swiss Locomotive and Machine Works of Winterthur, Switzerland. The chief objects aimed at in the design are the overcoming of difficulties in negotiating curves of short radius. It is pointed out that in cities it is impractical to use curves of long radius, and curves with radii of 33 to 40 ft. are standard. This, in turn, makes it necessary to use a short wheelbase of 80 to 120 in., and with such a short wheelbase the ends of the car necessarily overhang a great deal. This overhanging of the car body causes unpleasant pitching in regular operation.

The characteristic feature of the new underframe is a shaft drive to the front and rear axles. As may be seen from the illustrations herewith, the car has four axles, the two inner axles supporting a truck upon which the power plant is carried. The front and rear axles are very similar to motor truck axles with so-called double gear reduction. Each of these axles has its propellor shaft encased in a trumpet-shaped housing which connects with the transmission gear on the central truck by means of a ball and socket joint. The whole structure therefore is flexible and can readily follow curves of comparatively short radius.

The drive to each axle is through a first reduction by bevel gears and a final reduction by spur gears. The rear axle is split and driven by two sets of spur gears. No differential gear is used, but a certain amount of differential action is obtained by providing the driven gears with cushion springs. The chief object in using this differential device is to do away with the shrill noises produced by the slipping of the wheels on the rails at sharp curves.

Automotive Type Brakes

Brakes of the automotive expanding type are provided on the axles and are entirely enclosed, hence they are protected from dust and dirt. The body of the car is supported on the front and rear axles through half-elliptic springs.

It is admitted that the change from four to eight wheels involves a certain complication, but the manufacturers state this disadvantage is far overbalanced by the advantages of reduced upkeep of both car and track, an in-

creased number of seats made possible by the lengthening of the wheelbase, and economy of fuel and oil due to the reduced resistance on curves.

This new type of underframe is said to be specially adapted for use in rail cars. It permits of carrying the power plant on the central truck, so that absolutely no vibration from it will be transmitted to the car body. A drawing of a 180 hp. rail car submitted with this article shows, besides a compartment for baggage and mail, seats for 66 passengers. The engine, change speed gear, reversing gear, fuel tanks and air reservoir are all installed on the central truck and do not project into the car body.

French Experimental Work on Valve Steels

IN order that steels which are required to pass through numerous working cycles within an extended thermal range, may withstand for a long time the stresses to which they are exposed, it is necessary that their characteristics should return to the same values after each cycle, and that, in consequence, there are no critical points in the thermal zone. Under these conditions the "reversibility" of the steel is assured; that is to say, when the steel has cooled one finds the austenitic or sorbitic structure to the exclusion of the trosstitic structure in a more or less accentuated coalescense, the heterogeneity of which has often given rise to great disappointment.

Some experimental work bearing on the application of the above principle to valve steels, and particularly steels for valves for "forced" aircraft engines, has been done in France and was reported upon in a note to the French Academy of Sciences by Charles Grard, presented by M. Leon Guillet. It is stated in this "Note" that the principal requirements in respect to these steels, and which extend over the entire temperature range of the working cycle, are as follows: Reversibility of the metal, the highest possible thermal conductivity, resistance to the corrosive action of the burnt gases, resistance to repeated shocks, sufficient resilience and hardness, and lightness.

Results of Research

Admitting that important improvements can be made by suitable mechanical design, metallurgical research has led to the following results:

High nickel alloys, which are very resilient, sometimes seize at high temperatures; the so-called high speed steel are hard, particularly when hot, but brittle and not very resistant to repeated shocks; moreover, both of these steels are relatively heavy.

Silicon chromium steels permit of lightening the valves by as much as 30 grams (about one ounce) as compared with the steels previously mentioned, in the case of a 450 hp. Lorraine engine, which materially cuts down the inertia forces due to the reciprocating motion. It is thus in this direction that M. Grard carried on his research work, seeking first of all, by methodically varying the components, to force the critical points beyond the maximum temperature reached by the valves in service. He specially covered the ranges of alloys of which the compositions are given in the following table. This table gives the critical points of transformation and the resistances to repeated shock, and it will be noted that the silicon content has a very important influence on the critical points.

No. of the Steel	Carbon Content	Silicon Content	Chromium Content	Ac Point Deg. F.	Res'st. to R'p't'd shock
		First Group			
1	0,570	1,565	13,140	1,598	18,570
2	0,395	1,960	11,610	1,630	19,130
3	0,560	1,920	14,210	1,652	20,300
4	0,470	1,775	11,800	1,652	18,790
		Second Group			
5	0,580	2,440	13,140	1,688	15,600
6	0,535	2,830	14,000	1,742	16,710
7	0,390	2,900	12,060	1,742	18,140
8	0,490	2,870	11,740	1,778	18,107
		Third Group			
9	0,540	3,885	13,130	1,868	15,570
10	0,355	4,030	11,610	2,022	9,473
11	0,345	4,020	12,020	2,060	6,918
12	0,410	4,100	14,080	2,138	3,498

Of the three groups of steels thus obtained the first one was discarded, because the temperatures of its critical points are too low, the third was also discarded, because the precipitation of graphite, due to the excessive silicon content and revealed by micrographic examination, entails too low a resistance to repeated shock and too low resilience; in the second group the compositions 5, 6 and 8 gave insufficient resilience (less than 2), by reason of their too high carbon content. Selection was made, therefore, of composition No. 7 (C, 0.40 per cent., Si., 2. 5 per cent, Cr., 12 per cent) which, after being air-hardened at 2200 deg. F. and drawn at 1,650 deg. has the following mechanical properties: Critical point on the rise in temperature, beyond 1650 deg.; specific gravity, 7.8; tensile strength when cold, greater than 130,000 lbs. per sq. in. elongation when cold, greater than 12 per cent resilience when cold (what is evidently meant is notched bar test result) greater than 4; Brinell hardness when cold, greater than 280; Brinell hardness at 1650 deg. F., a little less than 40 (this latter figure was slightly raised by the addition of 1.5 per cent of tungsten.

Chromium silicon steel valves of the above composition, fitted to a Lorraine 450 hp. engine, passed through a 50-hr. endurance test without giving the least trouble —a case of sufficient rarity to merit mention. After the test the valves retained the same polish and texture as at the beginning.

HEALTHY growth of the automobile movement in Tunisia, northern Africa, is reported in a commercial notice just published by the Regence of Tunisia. The number of automobiles in service on May 30, 1925, was 3,324, of which 2,611 were private cars, 236 trucks and 126 automobiles for public conveyance.

The greatest volume of business is being done by French manufacturers. Returns, which give automobile importations in kilogrammes, show 953,171 last year from France, followed by 159,023 from the United States and 63,788 from Italy. Importations from other countries were small. The types of automobile having the biggest sales are of 5, 10 and 15 hp. (European rating). The use of trucks, particularly of 3-tons capacity, has extended considerably since the war. The use of light trucks of 1-ton to 1½ tons capacity is not as extensive as it might be, for there is opposition from cheap native haulage.

Automobiles and parts are not affected by the new import tariff bill recently passed by the Japanese Diet and put into force March 29. Many changes, mostly increases, were made in the rates applying to other products imported from America, however. Ball bearings, for instance, are now subject to a duty of 20 yen ($10 at normal rate of exchange) per 100 kin. (A kin is equivalent of about 1 1/3 lb. avoir.) A duty of 25 per cent ad valorem has been placed on gearing chains. The rates on mineral oils are slightly decreased.

Twin-Wheel Grinding Now Applicable to Crankshafts

Production increased 80 per cent where two or more diameters are ground, by mounting two or more wheels on one wheel sleeve. Steering knuckles handled this way now in most large plants.

By Raymond A. Cole
Experimental Engineer, Norton Co.

DURING the past few years there has been a pressing demand, especially by automobile production men, that grinding costs be reduced, as well as all costs that affect prices of the finished product. Many parts have two or more diameters that must be ground. Sometimes these diameters are equal but usually they are different. The natural and logical development has been to mount two or more wheels on one wheel sleeve, separating them by spacing collars. This combining of cuts has increased production about 80 per cent.

The twin-wheel grinding of steering knuckles, as shown in Fig. 1, has been studied very thoroughly and is now general practice in large plants. From the illustration it can be seen that the general arrangement of the machine is the same as for ordinary wide-wheel grinding. For training the grinding wheels a multistop ring is added to the wheel feed index. On this are mounted two stops that are adjusted so that the wheels will be trued to diameters that will produce the correct diameters on the steering knuckles.

On the particular knuckle shown, the larger diameter is 1.312 (+0.000,—0.0005) by ¾ in., while the smaller one is 0.8745 (+0.000,—0.0005) by ¾ in. The machine used is a Norton 10 by 18-in. Type A, belt-driven one; the grinding wheels are 20 by 1½ by 12 in., 1924 CN vitrified alundum, running at 1200 r.p.m. Production averages 100 per hour, from 0.015 to 0.020 in. of stock being removed. An average of 50 to 60 pieces is obtained per dressing of the wheels.

Grinding Drive Pinions

Another part that is sucessfully ground by this method is the drive pinion illustrated in Fig. 2. This part shows the application of this method of grinding to a part whose section between the cuts is larger in diameter than the cut itself. The machine used is a Norton 10 x 18-in. Type A belt-drive, the grinding wheels are 20 by 1½ by 12 in. and 20 by 1 by 12-in., 24 CN vitrified alundum, running at 1200 r.p.m. The work speed is 160 r.p.m. The diameters ground are 1.377-in. and 0.984-in. and both are held to a 0.0005 tolerance. Production on this part is 45 per hour.

Another part that combines the grinding of a taper and a straight diameter is shown in Fig. 3. The straight diameter is 0.249 (+.000—.0005) by ¼ in. long and the taper is 5/16 in. long and is held to a tolerance of plus or minus 0.010 from surface A. This part was originally ground on two machines, which produced 118 shafts per hour. This grinding is now done on a 6 x 32-in. Norton Type A belt-drive machine mounting two 14 by 7/16 by 5-in., 6624 CM vitrified alundum wheels running at 1370 r.p.m. A work speed of 250 r.p.m. is used. Production by the twin wheel method is 200 shafts per hour, 0.015 in. of stock being removed.

For truing the wheels used on the distributor shaft,

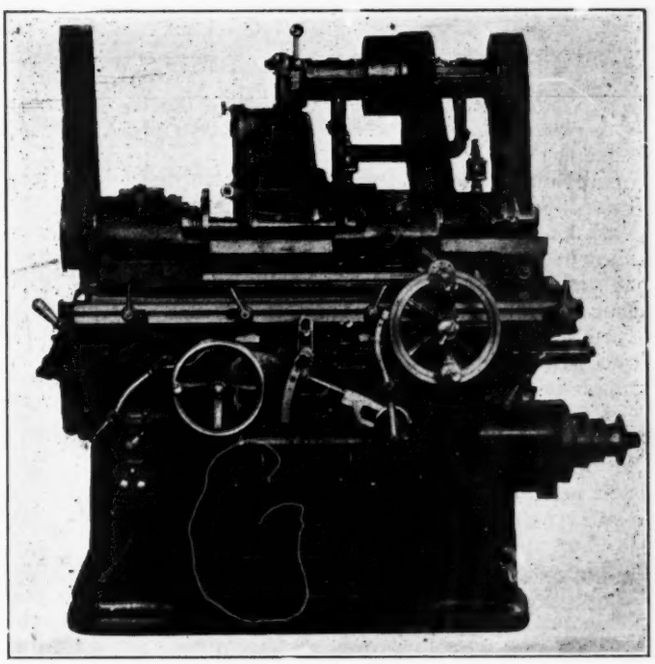


Fig. 1. Twin-wheel grinding of steering knuckle

a wheel-forming device is used, instead of the multistop index. This device includes a form bar which is made so that the shapes trued on the wheels bear the correct relation to each other. To further facilitate this truing

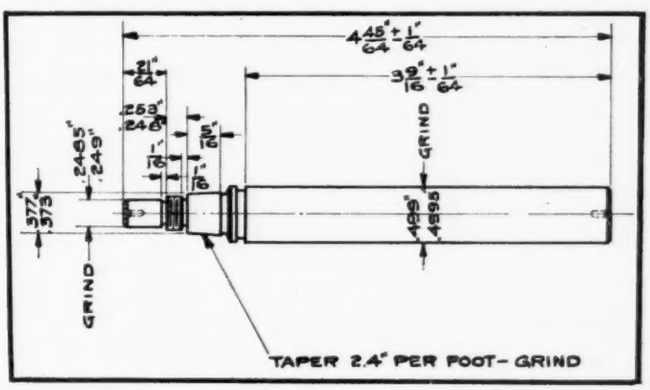
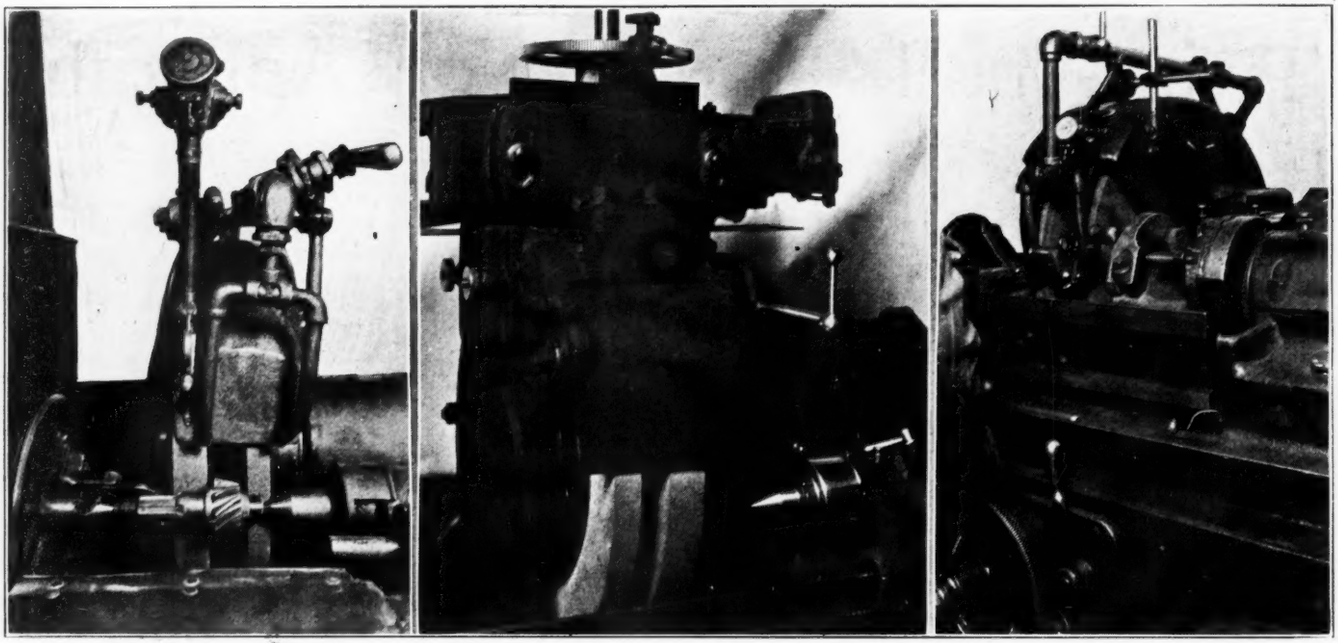


Fig. 3. Distributor shaft



Left, Fig. 2. Twin-wheel grinding bearing seats on pinion shaft of rear axle drive. Center, Fig. 4. Wheel-guard and wheel-forming device. Right, Fig. 5. Twin-wheel grinding the center pins of the Ford crankshaft

operation, the wheel-truing device mounted on the wheel guard, as shown in Fig. 4, has been developed. The path of the diamond is governed by the forming bar shown directly under the notched wheel. The diamond is traversed across the wheels by an electric motor mounted on the rear of the guard. Another novel feature of this attachment is that the water is directed onto the wheels inside of the guard. This does away with much of the spray ordinarily present.

Various parts have been ground by this twin wheel method, and the latest developments indicate that it can be applied to crankshafts. Production men in general will be interested in the results obtained in grinding the center pair of pins of the Ford crankshaft. The set-up is shown in Fig. 5.

The machine is a regular Norton Type B crankpin grinding machine with the pot chuck equipment regularly made for single wheel grinding. A special wheel guard and wheel sleeve are required on which are mounted two wheels with spacing collar between to give the correct dimension.

Experience in grinding these shafts led to the recommendation of a pair of 26 by 1½ by 12 in. vitrified alundum wheels, 46 D P, running at approximately 6500 feet per minute surface speed. The work is rotated at about 98 r. p. m. Finish grinding, removing 0.050-in. stock on the diameter, was accomplished in 50 seconds actual time, or 1½ minutes per shaft including handling. The tolerances to which this work was held were + 0.000, — 0.002 in.

From the illustration it will be noted that only one two-bearing steady-rest, located opposite the outer wheel, is required. An indicating gage is mounted on the wheel guard and measures the inner pin. The twin wheels hold size very well, averaging 30 to 35 shafts per dressing.

In previous practice, in which a single wheel was used which was moved from one pin to the other, 22 shafts were fiinished-ground per hour on the inner pins, or 2.7 minutes per shaft. This shows an increase in production per machine of about 80 per cent.

The machine shown in the illustrations of crankshaft grinding by the twin-wheel method is equipped with regular wheel feed, but for this grinding operation a lever feed is used that moves the wheel back about ¾ in. in 80 degree movement of the lever. This fast movement of the wheel slide gives the extra clearance necessary for the rapid handling required in high production.

From the example cited it is evident that rapid developments will be made in this method. It is possible to equip a grinding machine so that rapid production can be obtained by combining cuts. While wheel maintenance cost may be slightly increased, the savings in labor cost will more than offset this. It is also possible to use standard machines with very little special equipment, although the next logical development is a machine with two wheel slides independently adjustable for spacing and position.

SINCE 1914 the specifications of the American Society for Testing Materials for malleable iron have been raised twice through solicitation from the American Malleable Castings Association the members of which supply the products known as Certified Malleables. During this period tensile strength of malleable iron has been increased from 38,000 to 50,000 lb. in the specifications and the elongation from 5 per cent in 2 in. to 10 per cent.

The reasons behind this advance in the qualities of malleable iron is outlined in a recent bulletin published by the Association. In it is traced the growth of the malleable iron industry since the discovery of the process of making brittle iron malleable in 1826. The Association was formed in 1913 and at once established a certificate plan whereby the products of its members were tested by the Association and production methods were also investigated.

To those members whose products and factories passed the tests were issued certificates of merit and by extensive advertising the Association has made Certified Malleable well known throughout industry.

The bulletin contains considerable interesting information regarding the tests to which members' products are subjected, methods by which malleability is obtained, physical properties of Certified Malleables and the various uses to which they may be put.

Just Among Ourselves

Where Overland "Whippet" Got Its Name

A NEW name appears on the automobile horizon with introduction of the Overland "Whippet." Since the announcement of the car and the name last week we have had to do some research work in order to dispose of the long line which formed on the right to ask, "What's a Whippet?" About all the average American knows about the term is that it was used during the war to describe the baby tanks developed in England. But it was a common word in Great Britain long before the war and was coined there originally to designate a special breed of racing dog which resembles the greyhound, but is smaller. The dog is a cross between a terrier and an Italian greyhound. The racing of whippets is a great sport in the colliery regions of northern England and on account of their speed the dogs also are used extensively by hunters for chasing game, or coursing as it's called over there. So now we all know what a whippet is.

* * *

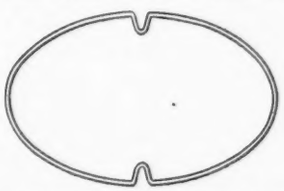
Curtis Classes Jordan With Best Ad Writers

AUTOMOBILE advertising copy has had lots of criticism from experts outside the industry, but now an automotive man has been picked as one of eight favorite ad writers by no less an authority than Cyrus H. K. Curtis, who has seen a lot of them come and go in his time. The trouble with most copy, the Satevepost boss says in an interview for *Editor and Publisher*, is that it loses all its vigor by the time it gets the usual shave and haircut. It isn't hard to guess the automotive man chosen as Mr. Curtis' favorite. "I must add Edward Jordan to the list," Mr. Curtis said. "He writes about his automobile in a way that commands attention. He writes simply. He sets down talk, not writing. His copy has the conversational sound." Then, after voicing the opinion that newspapers and book publishers are the worst advertisers in the country, Mr. Curtis went on, "Mr. Jordan has the faculty of telling his story in such a way that it excites your curiosity and you read it. A Mr. Jordan is needed by the newspapers and book publishers." None of this is news to automotive men, of course, but it's good to see recognition of automotive effort spread.

* * *

A New Wrinkle in the French Grand Prix

A NEW wrinkle was introduced in this year's French Grand Prix over the 3-mile Miramas course near Marseilles. Shortly before the race was held the track officials thought it ought to be made more difficult for both the cars and the drivers, so they introduced two sharp U-shaped or hairpin curves, one on each side of the course, with the result that the contestants did their racing on a track which looks like this:



Every 1½ miles the cars had to slow down to 15 or 20 miles an hour in order to negotiate the trick curves. It was almost impossible for the maximum speed on top gear ever to be attained. In addition to cutting down the speed, the curves imposed the severest kind of a test on engines, gearboxes and brakes. The manufacturers of the competing cars complained bitterly that the course had not been altered until their cars were completed and that in their designs they had provided for prolonged speed without taking into consideration such performance as was required under the new conditions.

* * *

Racing Car Builder Now Has Catalog

WE have just received what, to the best of our knowledge, is the first catalog issued by a manufacturer of racing cars. It comes from Harry A. Miller, Inc., and comprises twelve pages in addition to covers. A 91 cu. in. rear drive car is offered at $10,000 and front drive model at $15,000. The issuance of this formal catalog would indicate that interest in racing is increasing rather than declining, inasmuch as one prominent builder, at least, has gone about selling a racing car just as other commercial products are sold.

* * *

Financing is Put on More Stable Basis

WHILE developments in automobile retail financing continue with almost as much rapidity as they were exhibiting last fall, current movements are less sensational and more constructive. A larger proportion of paper today is being handled on conservative terms and the worst of the extravagant instalment plans have been practically eliminated. Sheer force of economic failure disposed of most of them. Consolidations in the finance company field continue. The factory subsidy to finance companies hasn't brought any material sales advantages to the companies paying such subsidies so far as the sales records are indications. Some of the non-subsidy companies have done just as well. Retail financing problems still are an important phase of factory marketing program, but they no longer are acute.—N. G. S.

Ford's New Prices—

What Do They Portend?

Will they bring Ford back to his former dominant level as related to sales of industry as a whole?

By Norman G. Shidle

ANOTHER price reduction—the second since the beginning of this year—rumors of changes in time-payment plans or organization of a finance and insurance subsidiary, reversion to a policy of no advertising expenditure, and persistent talk about radical changes in present models or announcement of an entirely new car—these are just a few of the things which are causing so much conversational buzzing concerning the Ford Motor Co. these days.

By talking to any ten men in the automotive industry it is easy to learn 5000 things that Ford is going to do and an equal number that people think he ought to do "in the near future." Probably nobody knows how much truth there is in the various rumors which are going about, but a few items stand out as facts.

The inability of Ford to maintain his position with respect to the rest of the automobile industry in production grows more apparent as the months go by. Back in our issue of October 29, last year, we pointed out that Ford in the last few years had begun to feel the wind of competition for the first time. We showed figures to prove the fact, reasons to account for it, and added that the big test of the Ford organization would come when finally he found it necessary—as he surely would soon or later—to change the Model T radically and attempt to produce a new car to be sold at the same price as the old one.

Since that time the trends indicated have become more clear. "Ford is having difficulties. What will he do? Can he turn back the tide which has been sweeping against him?" These questions have furnished the basis for constant gossip and innumerable conversations throughout the industry in the recent months. Other commentators have taken up their journalistic piccolos and have been tooting the same tune publicly, while rumors of rapid Ford executive changes, of careful investigations of new foreign transmissions, and of the long talked-of six-cylinder model have formed a secondary motif of constantly growing crescendo in the industry's attempted orchestration of Ford problems.

The latest Ford price cut is generally accepted as being an attempt to stimulate sales and bring Ford back to his former dominant level as related to the sales of the industry as a whole. There is a suspicion in some quarters that the decrease this time has been made in preparation for launching of a new model, but there is no definite evidence to support that opinion.

A Ford price cut, while still an important event in the industry, no longer commands the attention that it once did, because other makers of low-priced cars have proved it possible to go forward very successfully without attempting to meet Ford on a price basis. Despite Ford's reduction in February, for example, one set of automotive sales records indicates that Ford sold less cars in the first four months of this year than in the first four months of 1925, while other low-priced vehicle manufacturers, such as Chevrolet, Star, Essex and others, were recording substantial gains over their 1925 sales achievements.

The effects of the present cut on the Ford sales curve cannot be determined accurately for several months, but there is nothing to indicate that price reductions alone will suffice to stem the tide which has been running against the industry's largest manufacturer for a number of months. Price is less effective in stimulating sales today than it ever has been before, because of the rather high dollar for dollar value obtainable now in nearly every automobile on the market and because of the increasing desire of the public for motoring comfort as well as mere transportation alone.

Not as Great as It Seems

It has been pointed out also that Ford price differential is not so great as it seems, not only because of extra equipment which many buyers add, but also because where instalment buyers are concerned both insurance and retail financing rates on Ford cars are relatively higher than on the other lower priced vehicles. Just what this difference amounts to varies, of course, with different localities.

In Philadelphia urban territory, for example, fire and theft insurance on Ford cars runs $5 per $100 of insurance as against $3.45 per $100 on Chevrolet, $2.50 per $100 on Star and $2 per $100 on Overland. Somewhat similar variations appear in the suburban rates in the Philadelphia territory, Ford being $3.70 per $100, Chevrolet $2.65, Star $2, and Overland $1.55.

As regards liability and property damage insurance, however, the rates on all of the first three cars mentioned are the same.

Despite the very liberal time sales plans which were tried out six or eight months ago in selling Ford cars—although without official sanction by the Ford Motor Co.—Henry Ford himself is not enthusiastic about this method of selling. In a recently published interview he expressed himself as being optimistic about business conditions but said:

"The thing that is troubling this country most just now is the amount of debt piled up by the credit system and instalment plan of buying. The American people no longer buy. They are backed into a corner and sold.

"I believe this debt situation will provide the jolt which will bring people back to a cash basis, where they already

Trying to fight off the competition which has been closing around him, Ford has again swung his old sword of price—this time with greater force. What will be the result?

know they should be. The Ford business, as far as it affects the Ford Motor Co. has always been on a cash basis. The result is that millions of cars have been sold at a minimum of risk to the makers and dealers, and a minimum of outlay to the buyers. We propose to stick to that policy, which is the only sound policy for any business."

Nevertheless, there are persistent rumors that Ford Motor Co. will soon announce a change in the financing of its time-payment sales to meet the competition of lower terms available for other cars selling in the low-price field. The rumors say that this change may take the form of a finance and insurance subsidiary inaugurated by the company itself under which lower interest rates would be available, or, as an alternative to this, the company may enter an agreement with a group of present financing companies under which all Ford paper would be handled exclusively by these companies on a zoning basis at rates comparable with rates offered on competing cars.

Along with his latest price reduction, Ford apparently has once again eliminated advertising from his merchandising program. Instead of trying to utilize more fully this force which other manufacturers continue to find potent in stimulating sales, Ford apparently is placing practically his whole reliance on price.

But there are many indications that other factors have a stronger merchandising appeal today than price alone. Study of Ford trends, as well as more general indications, point to this conclusion.

Not since 1918 has Ford production amounted to as little as 40 per cent of the total output of the industry. Yet his percentage of total output is estimated to have been less than 40 in every one of the first three months of 1926, approximate figures only for April and May being available.

Faced with the fact that price no longer is the powerful sales weapon that it once was, while design continues to play a part of growing importance, Ford has been unable to make any real progress toward improving his position in respect to the industry as a whole during the last six months. The diminishing efficacy of price as a merchandising weapon was emphasized particularly in our discussion of the Ford problem eight months ago.

Trying to fight off the competition which has been closing around him, Ford drew his old sword of price and lashed out with it again in February of this year. But his Excalibur no longer was possessed of supernatural abilities. It's death-dealing powers had become atrophied. It's point was dulled. It was just another sword.

And now he has swung it again—this time with greater force! What will be the result? Let's look at the effects of the February decrease.

In January of this year Ford built approximately 38 per cent of the total passenger car output of the industry as against about 49 per cent a year ago. In February his proportion of the total was about 36 per cent as compared with about 45 per cent in February, 1925.

His price cut came in the middle of February.

In March this year he produced about 34 per cent of the total passenger car output of the industry as against about 41 per cent in March last year!

Other cars of higher price are beginning to outsell Ford in isolated instances for short periods in scattered territories. The price advantage he still holds makes Ford necessarily a larger seller than any other car, but he doesn't hold the lead always, everywhere, as he once did.

Buick outsold Ford in April in the New York City metropolitan district by 2339 to 2313, while Dodge was right on Ford's heels with 2043. In this district Ford was ahead of Buick in February and March, but Buick led him in January. The total for the first four months, according to the best records available, show Ford with 5371 sales in the metropolitan district and Buick with 5238.

In the limited little area covered by the town of Norwalk, Conn., Ford was outsold in the month of March by Oakland, Buick, Chrysler, Essex, Dodge and Chevrolet.

Neither of these are typical instances, of course. They are isolated, unusual examples, but they do show that Ford's lead is not what it once was and bear out the indications given by analysis of the general statistical data on the subject.

Automotive Industries
July 1, 1926

Worm Gear Standardization Eliminates Waste in Hobs

New system for designing worm gears introduced by British firm. Method is based on the module.

By P. M. Heldt

A NEW system for the design of worm gears, whereby a certain degree of standardization is ensured and a better utilization of worm gear hobs is made possible, has been introduced by David Brown & Sons, Ltd., of Huddersfield, England, and is described in a pamphlet on "Automobile Worm Gearing" recently issued by that firm.

It has been customary in the past to base the design of worms on the axial pitch or circular pitch system. That is, the axial pitch of the worm and the circular pitch of the wheel (which latter is equal to the former) are made a rational dimension. The objection to this system is that the pitch diameter of the wheel then is always an irrational number.

This applies wherever the circular pitch system is used, and to avoid the difficulties referred to, the countries using the English system of units long ago adopted the diametral pitch system for gearing generally. With this system the pitch diameter is equal to the quotient of the number of teeth divided by the diametral pitch. This gives rational numbers for the pitch diameter in some cases but not always. For instance, the pitch diameter of a 31-tooth 6 pitch gear is equal to 5.166666 + in. In fact, such recurrent numbers occur very frequently in dealing with gears on the diametral pitch basis.

The new DBS standard method of worm gear design is based on the module. The term module is quite familiar in gear work, as it has been used for a long time in countries using the metric system of measures. The module is simply the quotient of the pitch diameter by the number of teeth, and it is therefore the reciprocal of the diametral pitch. This unit lends itself particularly for use with the metric system, for the reason that if the pitch diameter is expressed in millimeters, the modules of the most commonly used sizes of teeth are integers.

With inch units the module is ordinarily a fraction, but by the DBS system it is so chosen that it is accurately expressed by a two-place decimal. For worm gearing in general the expression for the center distance is

$$C = (D + d)/2$$

where C is the center distance; D, the pitch diameter of the wheel and d, the pitch diameter of the worm. If M represents the module and T the number of teeth in the wheel, then by the definition of module (pitch diameter divided by number of teeth), $D = TM$. By the DBS system the ratio worm pitch diameter/module is represented by the letter q. Hence, $d/M = q$ *and* $d = Mq$. Therefore, substituting in the above equation for the center distance C we have

$$C = (TM + Mq)/2 = (T + q)\,M/2$$

From this it follows that the module

$$M = 2C/(T + q)$$

Both the center distance and the ratio q can be varied *ad libitum*, and these are varied slightly so as to make M expressable by a two-point decimal.

In textbooks on worm gearing can be found the equation

$$L = d_p\,\pi\,\tan\,\theta,$$

where L is the lead of the worm and θ the lead angle. This can be changed to the form

$$\tan\,\theta = \frac{L}{d_p\,\pi}$$

But

$$L = t\,p_a,$$

where p_a is the axial pitch of the worm. Substituting,

$$\tan\,\theta = \frac{t\,p_a}{d_p\,\pi}$$

Now, in the DBS system

$$q = \frac{d_p}{M}$$

But $M = 1/p_d$ *and* $p_d = \pi/p_a$, *hence*

$$M = p_a/\pi$$

and

$$q = \frac{\pi\,d_p}{p_a}$$

The inverse of this,

$$1/q = \frac{p_a}{\pi\,d_p}$$

hence,

$$\tan\,\theta = \frac{t}{q}$$

This is one of the fundamental relations used for calculating worm drive gears by the DBS system.

In the application of the above equations, the numbers of teeth T and t of the wheel and worm, respectively, would be assumed, as would the lead angle and the center distance, the latter, of course, depending upon the amount of power to be transmitted. We then have the following known factors: Number of worm teeth, number of wheel teeth, lead angle, center distance. The factors to be calculated include the worm pitch diameter, wheel pitch diameter, lead of worm, lead of wheel, module, worm outside diameter, worm bottom diameter, wheel throat diameter, wheel overall diameter.

The value of q is first determined from the relation

$$tan\ \Theta = t/q,\ so\ that\ q = t/tan\ \Theta,$$

which can be readily solved since both t and Θ are known and hence $tan\ \Theta$ is known also.

Next the value of M is determined from the equation

$$M = 2\ C/\ (T + q).$$

All of the factors of the right hand side of this equation are known, hence its solution offers no difficulty. In most cases, of course, the value of M will come out an irrational fraction. But by changing the value thus arrived at by not to exceed 5 per cent it can be expressed exactly by a two-point decimal.

The worms are defined by the three elements t, q and M. For instance, a worm with four leads having a value of q (worm diameter/module) of 5 and a module (1/diametral pitch) of 0.30, would be designated a 4/5/.30 worm.

It is recommended by the David Brown & Sons, Ltd., that modules which are multiples of 0.05 in. be employed wherever possible, and that where latitude in design is limited the module be made a multiple of 0,01 in.

The usual formula for the lead of the worm is

$$L = t\ p_a$$

and since

$$M = \frac{1}{p_d} = \frac{p_a}{\pi},$$

$$p_a = \pi\ M,$$

and

$$L = t\ \pi\ M$$

With the DBS system the addendum, dedendum and clearance are based on the normal module M_n, which is equal to $M\ cos\ \Theta$. The worm addendum is made 1.5 M_n, the dedendum 0.6 the addendum, the clearance 0.1 the addendum, the wheel throat addendum, 0.5 the worm addendum and the wheel overall addendum, 0.8 the worm addendum.

The width of face of the worm is determined by the equation

$$f = 2\sqrt{a^2 + a\ d},$$

where d is the worm pitch diameter. This is said to be the maximum economic width of face. Chamfering the sides of the wheel face is not recommended. The blank should be finished to cylindrical form, the throat being left to be formed by the hob, unless a fly cutter is to be used.

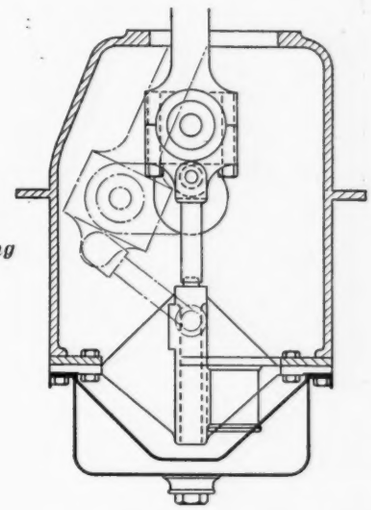
The same hob can evidently be used for all worms of the same module and lead angle, and if module and lead angle are standardized, the number of hobs required can be greatly reduced. Moreover, the efficiency of worm gearing is directly dependent upon the lead angle, and with the system described, since the lead angle is chosen and other dimensions of the worm are then calculated to conform with this angle, the lead angle corresponding to the maximum efficiency (45 deg.) can be selected. Of course, the efficiency does not vary materially for a considerable range of angles to both sides of 45 deg.

Balancing 4-Cylinder Engines

A METHOD of balancing the reciprocating parts of engines which makes use of additional reciprocating parts, has been patented in England by Sir Herbert Austin. A series of sliding weights are arranged below the crankshaft and are connected by links to the connecting rod caps. The system of balancing is intended evidently for four-cylinder engines.

In a four-cylinder engine the primary unbalanced forces are neutralized because the two outside pistons move up and down together and the two inner pistons also move up and down together and in opposition to the outer ones. The secondary inertia forces, however, are not balanced, because when one set of pistons is on the upper half of the stroke the other half is on the lower half, and the piston speeds are not the same at corresponding points of the upper and lower halves of the stroke.

The secondary inertia force may be regarded as due to the fact that any piston during the first quarter revolution of the crank from the top dead center position



Austin method of balancing four-cylinder engine

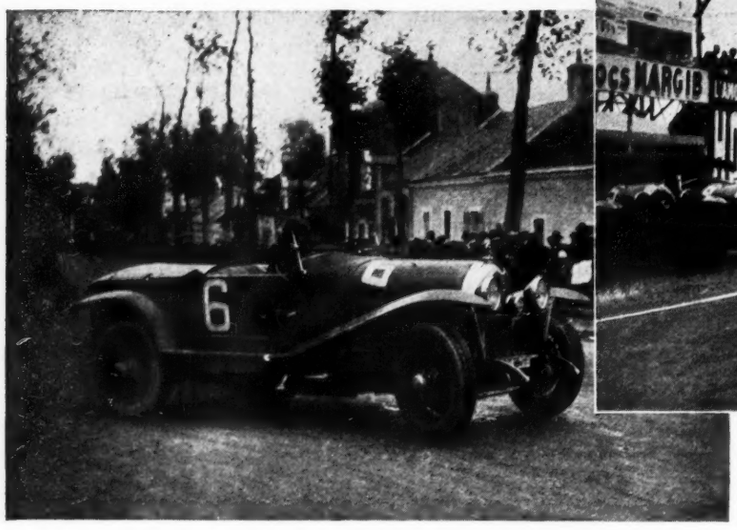
travels at more than the average piston speed. The sliding balance weight below the crank travels in the same direction as the piston, but during the first quarter revolution of the crank this weight travels at less than its average speed. Hence the two weights (the piston and the sliding balance weight) travel simultaneously in the same direction, one at more than its normal speed and the other at less than its normal speed. The excess speed of the piston during this quarter revolution, which is the cause of vibration in the ordinary four-cylinder engine, is therefore compensated for by the deficiency in the speed of the balancing weight.

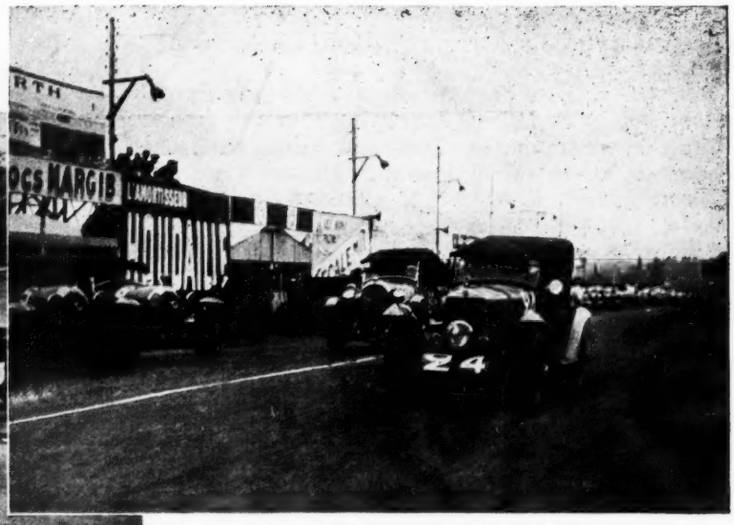
By making the link connecting the sliding weight to the connecting rod head comparatively short, so its maximum angularity will be relatively great, the sliding balancing weight can be made small. On each of the four balancing weights there will be both primary and secondary inertia forces, but the primary inertia forces of the four weights will cancel out as it were. The secondary inertia force on each sliding weight will balance the secondary inertia force of the piston to which it is connected.

FOR shops where coping work is done on angles, I-beams, tees, channels, zee plates and flats, a new No. ½ Universal Iron Worker has been developed by the Buffalo Forge Co., Buffalo, N. Y. In addition to the coper, it has the regular punch, shear and bar cutter of the company's Universal Iron Worker. The coper is built on the punch end of the machine and is operated by the same plunger and actuated by the same controls. The specific advantage claimed for the coper is that it is not necessary to interchange coping tools with the standard coping tools as required with the ordinary coping attachment.

The new machine will handle 5 in. channels, 6 in. beams and 3 by 3 by 5/16 in. angles. One cut only is required for full depth on all sections.

210 cu. in. Lorraine-Dietrich which won the 24-hour race at LeMans





Standing start of the French 24-hour race

Lorraine-Dietrichs Win 24-Hour Road Race at Le Mans

New record set for course when Bloch and Rossignol cover 1585.99 miles at average speed of 66.08 m.p.h. American entries forced out. One of Overlands wrecked in try-out.

By W. F. Bradley

DRIVING a stock six-cylinder Lorraine-Dietrich of 210 cu. in., Block and Rossignol covered a distance of 1585.99 miles in the 24-hour road race at Le Mans for the Rudge Whitworth Cup, June 12-13, thus averaging 66.08 miles an hour and creating a world's record for this distance on the road. Last year the winner, on the same make of car and over the same course, covered 1388 miles.

Second and third places were also taken by Lorraine-Dietrich cars, with distances of 1574.2 and 1493.4 miles respectively, and a couple of 122 in. O.M.'s also broke last year's record.

This race, which has attained premier position among automobile competitions in France, and directly influences the buying public, is open to stock cars to which certain modifications can be made. It really comprised two events in one, for of the 41 starters 11 had been qualified by last year's performance to run for the final of the second year's cup, which was awarded for the best comparative speed performance in proportion to piston displacement, while the others were out with a view to attaining the greatest distance in order to qualify for next year's final.

The cup was won outright by De Courcelles and Mongin on the the Lorraine-Dietrich which covered the second greatest distance; it defeated an Italian O.M. driven by Foresti and Minoia by a very small margin.

The race was held on the 10¾ mile circuit near Le Mans which was the scene of the French Grand Prix won by Murphy on a Duesenberg in 1921. The local club has erected permanent grand stands on what was once the site of an American army camp, and has government authority to use the roads for racing at intervals.

Forty-one cars came to the starting line. Greatest competition lay between a couple of sleeve valve Peugeots driven by Boillot and Louis Wagner, the team of three Lorraine-Dietrichs and a team of British Bentleys. Boillot's Peugeot lost its windscreen during the night and under the rules had to be retired while leading. Wagner's car was stopped by reason of a dead storage battery, also when among the leaders. Wagner pushed the car to start the engine, but rules required that the electric motor should function all the time and he was disqualified. The three English Bentleys then furnished speed, but after half distance one went out with a broken valve stem, the second broke a rocker arm when among the leaders at three-quarter distance and the third ran off the course during the last half-hour.

A Willys-Knight and two Overlands were entered in this race by the European distributor. The driver of the Overland saloon took a turn too fast when practicing two days before the race, and after hitting a tree his car was entirely destroyed by fire. The second Overland was run with a view to qualifying next year and was being driven to schedule, which called in this case for a minimum average of 53 miles an hour. It maintained an average of 50 miles an hour until the last hour, when an oil leak developed between the upper and the lower parts of the crankcase, thus causing it to be withdrawn, for oil and gasoline supplies could be taken only at intervals of 214

miles. The Willys-Knight went out early owing to the inability to get a sufficient supply of gasoline to the carburetors. It could not be discovered whether the vacuum tank was defective or whether the gas line was choked.

Framed to test fully equipped stock cars, the rules for the Rudge Whitworth twenty-four hour race stipulate that competing cars must be types sold to the public, but changes are allowed in valve timing, compression, and weight of reciprocating parts. Two men are allotted to each car but only one handles it at a time; no outside supplies of any kind can be taken; six tires only are allowed, and gasoline, oil and water could be taken only at intervals of 214 miles. The first 214 miles had to be covered with the hood raised. The lighting system had to function throughout the night, and it was forbiden to start by pushing or cranking.

Engineer Moglia, who was entrusted with the task of preparing the Willys-Knight and the Overlands, modified them for speed in accordance with the rules. He fitted a Ricardo head on the Overlands, increased the compression ratio to 6, increased the valve lift, increased the section of the gas passages, particularly at the outlet from the carburetor, and carried the horsepower up from 38 in the case of one engine and 39 in the case of the other, to 55 at 3200 revolutions for both engines. The power curve rose in a straight line up to 3200 revolutions and remained level up to 3700 revolutions. Increased power was obtained over the entire range of engine speed. Changes were made in the steering gear to render it less sensitive, the angle of the worm being changed from 8 to 11 deg.

Willys-Knight Changes

In comparison, the changes made in the Willys-Knight engine gave better results than those on the Overland, although the engineer was limited in the extent of the changes he could make on the valve ports. Compression ratio was increased from 4.9 to 5.7, two Berguil carburetors were fitted, and the gas passages were increased one-third, with the exception of the outlet from the venturi, where the increase was not more than one-sixth. The same changes were made on the steering as in the case of the Overland and light phaeton bodies were built for the race.

Practically all the competitors found it necessary to increase the oil capacity in order to cover distances of 215 miles at speed. On the sleeve valve Peugeots an oil radiator was bolted to the bottom of the aluminum oil pan and dry sump lubrication was employed. Oil temperature was decreased and there was a drop in oil consumption. The Lorraine-Dietrichs' passed their oil through a radiator combined with the water radiator. Ordinary vacuum tanks were found insufficient and were either duplicated or increased in size.

Apart from eliminations due to road accidents, the causes of failure, so far as they could be ascertained, were due to broken valve rocker, broken valve stem, back fire into carburetor, broken brake cable, loss of water after changing cylinder head gasket, loss of oil through defective crankcase joint, choked gas line, breakage of timing gear chain, seized pistons, windscreen support broken, Bendix pinion wedged, broken windscreen support, insufficiency of current in battery to start engine after the use of high candle power lamps, the taking of tools from pits during race.

This year the roads were in excellent condition, allowing a very fast pace to be set, and this was more destructive of mechanism than the poor road surfaces of last year, which automatically kept speed down. Tires gave excellent service, there being only three changes out of the 164 tires starting in the race. The three leading Lorraine-Dietrichs' went through the race without a tire change. Straight sides were used on the winning car, while drop center rims were plentifully in evidence. For the first time in a French competition clincher bead tries were not in a majority.

DISTANCES COVERED IN 24-HOUR RACE

	Miles
1. Lorraine-Dietrich, 210 cu. in., Bloch and Rossignol	1585.99
2. Lorraine-Dietrich, 210 cu. in., De Courcelles and Mongin	1574.2
3. Lorraine-Dietrich, 210 cu. in., Stalter and Brisson	1493.4
4. O.M., 121 cu. in., Minola and Foresti	1446.4
5. O.M., 121 cu. in., M. Danieli and T. Danieli	1405.92
6. Bentley, 183 cu. in., Davis and Benjafield	1284.6
7. Th. Schneider, 119 cu. in., Tabourin and Lefranc	1265.5
8. Rolland-Pilain, 121 cu. in., Chalamel and Stremler	1259.9
9. E.H.P., 73 cu. in., Bussienne and Decostier	1194.5
10. Salmson, 67 cu. in., Casset and Rousseau	1189.4
11. Corre-la-Licorne, 90 cu. in., Ericalde and Galoisy	1173.5
12. S.A.R.A., 67 cu. in., Lecureul and Marandet	1167.8
13. S.A.R.A., 67 cu. in., Duval and Armand	1117.7
14. Aries, 67 cu. in., Gabriel and Paris	1092.9

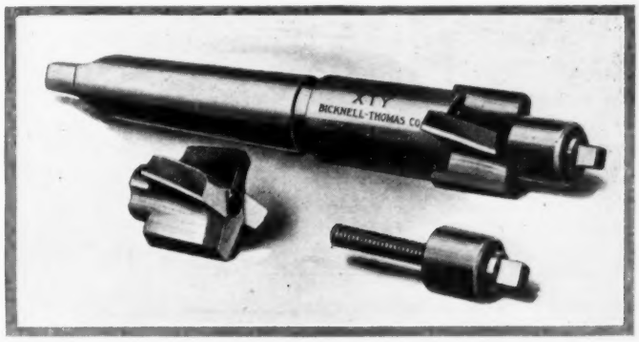
Minimum body dimensions were imposed, but there being no weight restrictions, fabric leather constructions were used very extensively. Six bodies were of the flat iron type, their width being equal to that of the width of the chassis, in order to recess the front and rear wheels. Their makers claimed an advantage in the reduction of head resistance. Peugeot eliminated the resistance of the headlights by mounting them on hinges under the hood, just behind the radiator. When required, they were swung out through a sliding door in the hood and held by a catch.

Christy Counterbores

A NEW type of interchangeable counterbore has been placed on the market by the Bicknell-Thomas Co., Greenfield, Mass. As may be seen from the illustration, the drive is by four substantial lugs which engage into slots in the end of the holder. The holder is made of alloy steel, hardened and ground. The cutters are of high speed steel, forged and twisted by a special process.

Several styles of cutter are furnished with this tool, as follows: A four-lipped cutter for use in spot-facing and general counterboring a two-lipped cutter for use in spot-facing where it is desirable to break under the scale immediately in order to save the cutting edge in sandy or poorly cleaned castings; combination cutters and pilots which are advantageous where the counterbore must be closely concentric with the hole, and countersinks for all sizes of holder in any angle desired.

A variety of pilots are furnished, including a bushed pilot consisting of a hardened bushing and a heat-treated chrome nickel screw, solid pilots, and roller pilots, the latter being recommended for work where there is danger of the pilot seizing.



Christy interchangeable counterbore

Relation Between Brinell Hardness Number and Tensile Strength Investigated

Research Department of Woolwich Arsenal, England, establishes set of ratios which simplify the process of finding tensile strength of various steels when the Brinell hardness is known.

AN investigation to determine the variation of the ratio between the Brinell hardness test and the tensile strength of steels has been made by the Research Department of Woolwich Arsenal and is reported on in a communication to the recent meeting of the Iron and Steel Institute by R. H. Greaves, D. S. C., and J. A. Jones. It has long been known that there is a certain degree of proportionality between these two values, but it has also been known that it is not absolute.

As carried out in practice, the Brinell hardness test is an empirical and arbitrary test; there is, therefore, little hope of discovering a fundamental relation between the results of this test and those of the tensile test, and an investigation of the ratio of the two results is chiefly a statistical problem.

At the Research Department in Woolwich much data on both Brinell hardness and tensile strength of a wide variety of steels had accumulated during the past few years. These were summarized in the paper and discussed together with data from other sources.

In all the tests carried out in the Research Department the following conditions were observed—(1) The Brinell hardness tests were made at not less than three positions along the length of at least one ground and polished face of a bar of rectangular section, from which the test-piece was subsequently turned. (2) The tests were made either in an Amsler ball hardness testing machine or in a single-lever testing machine. (3) A ball of 10 mm. diameter was used under a load of 3000 gk. The load was applied gradually, and held for at least 30 seconds. In the single-lever machines the balance was approximately adjusted at a lower load, the jockey weight was then moved slowly to the necessary position, held there for 30 seconds, and slowly rolled back to avoid all oscillation of the beam with the full load on. The impressions were measured with a measuring microscope fitted with a vertical illuminator, and reading to 0.001 mm. (4) The test-bar was then turned to a tensile test-piece (usually 0.564 in. in diameter) and tested in a single-lever testing machine (Buckton 30-ton or Avery 15-ton). All machines used, including the hardness testing machine, were calibrated several times during the period in which the tests were being made; the error in the loads measured throughout the tests probably never exceeded 1 per cent, and was usually much less than that figure.

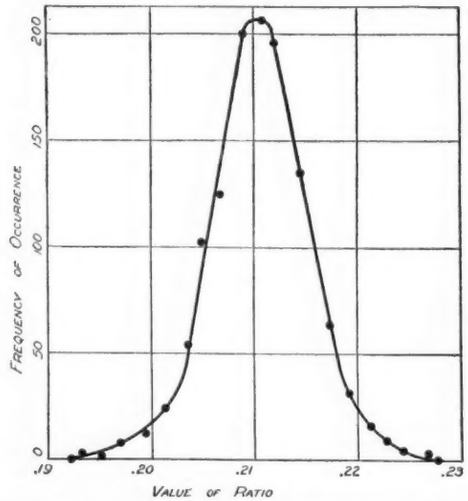


Fig. 1. Frequency of occurrence of different values of the ratio for 1161 alloy steels

Different Steels Tested

Tests were made on medium-carbon steels in the annealed and heat-treated conditions, and on oil-hardened and tempered nickel, nickel-chromium, and other alloy steels. Results were first classified according to (1) composition and hardness; (2) composition and yield ratio. A preliminary examination of the figures showed that, between certain limits, the hardness and the yield ratio of the steel had a smaller effect on the value of the tensile-Brinell ratio than had been expected, and it appeared to be justifiable to combine all the results on heat-treated alloy steels with a Brinell hardness number between 200 and 349 in one diagram, Fig. 1.

Table I. summarizes the ratio of tensile strength to Brinell hardness number calculated from data obtained in the Research Department and from the sources indicated. Values of the ratio deduced from three published tables of Brinell hardness number and corresponding tensile strength are added for comparison. From this table a close approximation to the correct ratio for any hardness can be obtained, but in practice it is often desirable to

TABLE I

Value of the Ratio of Tensile Strength to Brinell Hardness Number

	Carbon Steels.			Alloy Steels.				From Tables.		
Brinell Hardness Number, 10 mm. dia.m. Ball, 3000 kg. Load	Research Department, Woolwich	Institution of Automobile Engineers Research Committee	Shepard	Research Department, Woolwich	Institution of Automobile Engineers Research Committee	Gilbert and Mack	Strauss	Hadfield	Brearley	Hanby
150	0.223	0.229	.....	.....	.....	.....	.....	0.240	0.229	0.228
175	0.218	0.221	.....	0.214	0.217	.....	.....	0.234	0.224	0.230
225	0.215	0.216	0.212	0.211	0.213	0.224	.....	0.227	0.220	0.215
275	.....	0.212	0.218	0.211	0.215	0.217	.....	0.218	0.217	0.217
325	.....	.....	0.220	0.210	0.218	0.214	0.214	0.212	0.218	0.215
375	.....	.....	.....	0.212	0.220	0.219	0.211	0.211	0.219	0.216
425	.....	.....	.....	0.213	0.222	0.222	0.210	0.216	0.219	0.217
475	.....	.....	.....	.....	.....	.....	0.222	0.225	0 218	0.214

make use of a simple factor which can be easily remembered. The values recommended are:—

(1) For heat-treated alloy steels, with a Brinell hardness of 250-400 ..... 0.21
(2) For heat-treated carbon steels and for alloy per square inch 0.215
(3) For medium carbon steels, as rolled, normalized, or annealed 0.22
(4) Mild steels have not been examined in the Research Department in sufficient number to make it possible to give a definite ratio, but published work indicates that 0.23 is a suitable value to adopt for these steels as rolled, normalized, or annealed.

These ratios do not apply to severely cold-drawn nor to austenitic steels.

British Ratio 0.22

The British Engineering Standards Association suggests for general purposes a ratio 0.22, while the corresponding German Association recommends:

For carbon steels, tensile strength 19 to 63.5 tons per square inch 0.23
For alloy steels, tensile strength 41 to 63.5 tons per square inch 0.215

Systematic users of Brinell hardness tests are well aware of the differences in the Brinell hardness number determined with reasonable accuracy at points a short distance apart in the same specimen. These differences give a numerical indication of actual variations in properties from point to point and are useful as an indication of the departure from uniformity in a piece of steel, but they are a source of error in determining the ratio of tensile strength to hardness number unless special precautions are taken. Thus, it is rarely that the value of the ratio for a series of steels is known with a probable error of less than $\pm$ 0.003. The existence of this error is further argument for the use of an approximate ratio in round numbers. Until the probable error is reduced, the accuracy with which the forecast of tensile strength can be made from the Brinell hardness number is but little affected by the use of an approximate rather than the true mean value of the ratio.

The ratios given in the table and referred to throughout the article are those of tensile strength in long tons to Brinell numbers. Since one long ton is equal to 2240 lb., if it is desired to find the tensile strength in pounds per square inch the multiplying factor or ratio is 2240 times as great. Applying this to the four classes of steels above referred to we get the following ratios:

(1) For heat-treated alloy steel with a Brinell hardness of 250-400 470
(2) For heat-treated carbon steels and for alloy steels with a Brinell hardness below 250 480
(3) For medium carbon steels, as rolled, normalized or annealed 493
(4) Mild steels 515

To find the tensile strength of a steel when its Brinell hardness is known it is only necessary to multiply the Brinell number by the corresponding ratio. For instance, an alloy steel having a Brinell hardness between 250 and 400 has a tensile strength of 470 lb. p. sq. in. for each point of Brinell hardness.

Two Engines in Racing Car

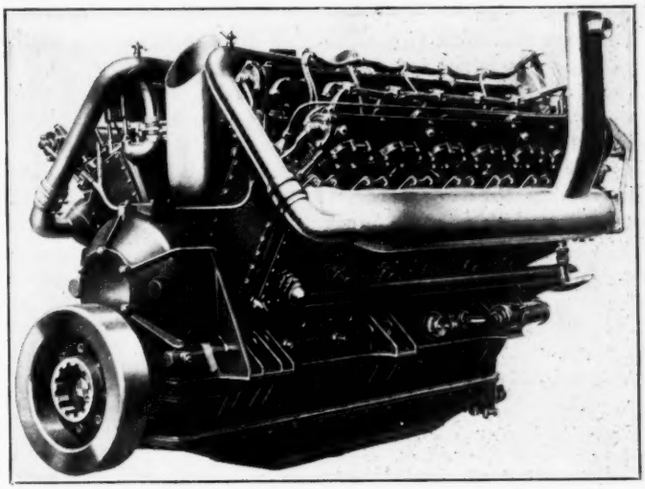
THE Sunbeam Motor Co., Wolverhampton, England, has under construction a new racing car with which it is hoped to lift the world's speed records for short distances to a high plane, 200 m.p.h. being mentioned. It will be unique in having an engine at each end, coupled to a central gearset whence, through a countershaft, the drive will be taken by side chains to the rear wheels.

The power units will be two twelve-cylinder "Matabele" (Sunbeam) aircraft and motor boat engines. They were actually used in 1920-1921 in a motor boat, and have been modified for their new purpose. (A racing boat with a single Matabele engine, it may be recalled, won the championship of the sea at Monaco in 1920.)

The general lay-out of the chassis includes half-elliptic springs front and rear and a frame of deep girder section. The front engine is to be mounted close up to the front axle and will transmit its power through a cone and dog clutch to a double-drive box, the latter connected by a tubular shaft to the forward end of the rear engine. From the double drive box the drive is being taken to a four-speed gearset with bevel gears transmitting to the countershaft for the side chains. No differential is to be fitted.

The wheelbase is 154 in., the track 60 in., and the overall length is planned to be about 22 ft. including the streamline tail. The maximum height from the ground will be approximately 48 in., viz., at the cockpit.

With its twelve cylinders cast in blocks of three, in two rows of six at an angle of 60 deg., the Matabele engine has a bore and stroke of 122 x 160 m.m., so that the total piston displacement of the two engines will be approximately 4750 cu. in. The cylinders are of aluminium with steel liners and each has four valves with two overhead cam-



Twelve-cylinder "Matabele" Sunbeam engine, of which two, modified to develop 500 hp. at 2000 r.p.m., are to be fitted to the new Sunbeam racing car now under construction

shafts (four per engine). Articulated connecting rods and dry sump lubrication are used. The original compression ratio was 5.15 to 1, but this is being increased to 5.6 to 1 which, it is believed, will increase the power per engine from 420 to 500 b. hp. at 2000 r.p.m. with a fuel consumption of .542 pints per b. hp. hour. It is estimated that the fuel consumption of the car at full speed will be approximately one Imperial gallon per minute. Ignition is by magnetos (four per engine) with two spark plugs per cylinder. Each engine weighs 1100 lb.

A point of note is the intention to fit a large flat undershield with a ground clearance of 7 in.; this will be made of armor plate, parallel with the ground, its stated object being "to provide a firm and strong base on which the car can slide in the event of a wheel coming adrift."

ALL "53" bus chassis manufactured by the White Co. are now equipped with B-K vacuum booster brakes. Westinghouse air brakes are continued as standard equipment on the larger or "50-A" bus chassis.

Latin America Building *Roads* for *177,000* New Automobiles

Completion of highways now under construction or planned expected to result in greatly increased demand for motor vehicles from United States.

By K. W. Stillman

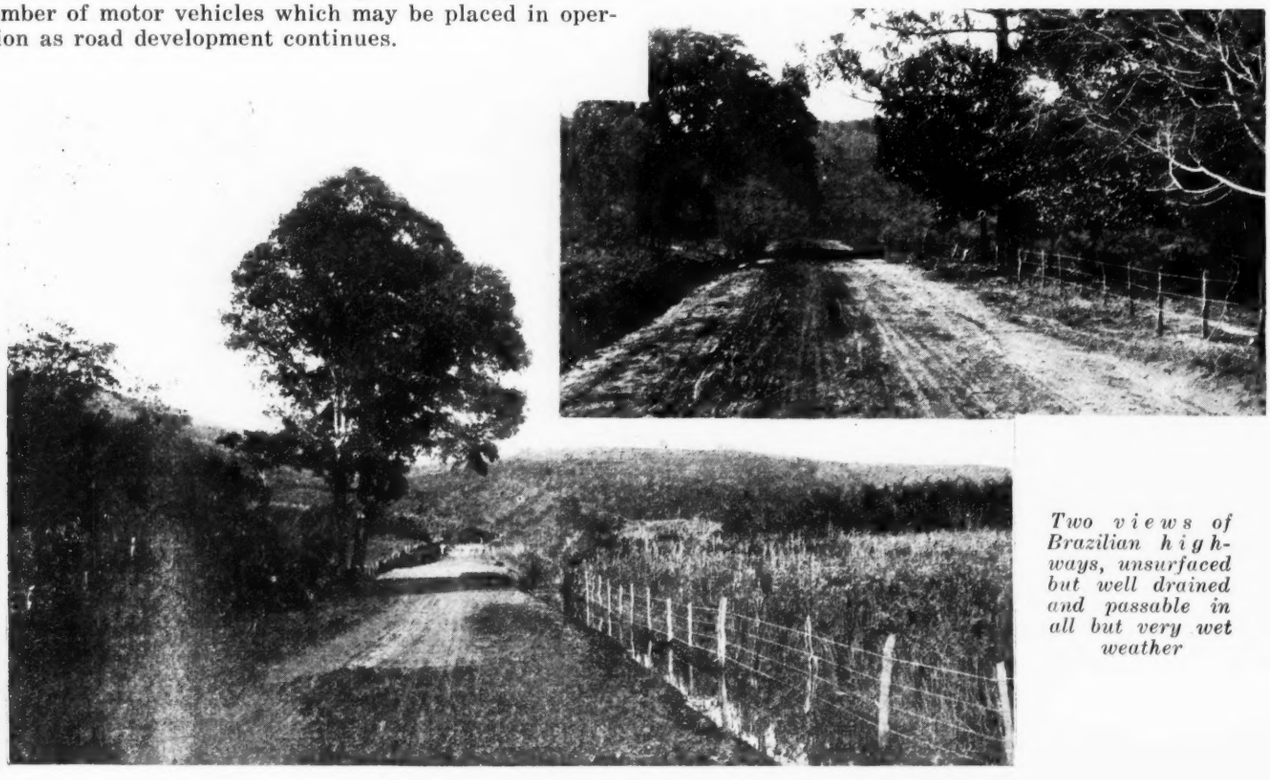
IF, as and when the highways projected or now under construction in Latin America are completed there probably will be created a market for something like 177,000 new motor vehicles, a considerable portion of which, in all probability, will be supplied by United States manufacturers.

It has always been known that there was a very close relationship between highway development and automotive population but insofar as is known this relationship has never been placed upon a definite basis. In Table 1 is shown the ratios of improved road mileage to motor vehicles registration for all the countries of Latin America, including Mexico, Central America and a number of South American countries. The average number of miles of road for each motor vehicle in these countries is 0.113. For the United States a similar ratio is 0.144. Because of the vast difference between the United States and these Latin American countries in density of population and in highway mileage as ratios of population or of area, it appears that this close agreement between the two sections in the matter of road mileage per vehicle may indicate to some degree the approximate number of motor vehicles which may be placed in operation as road development continues.

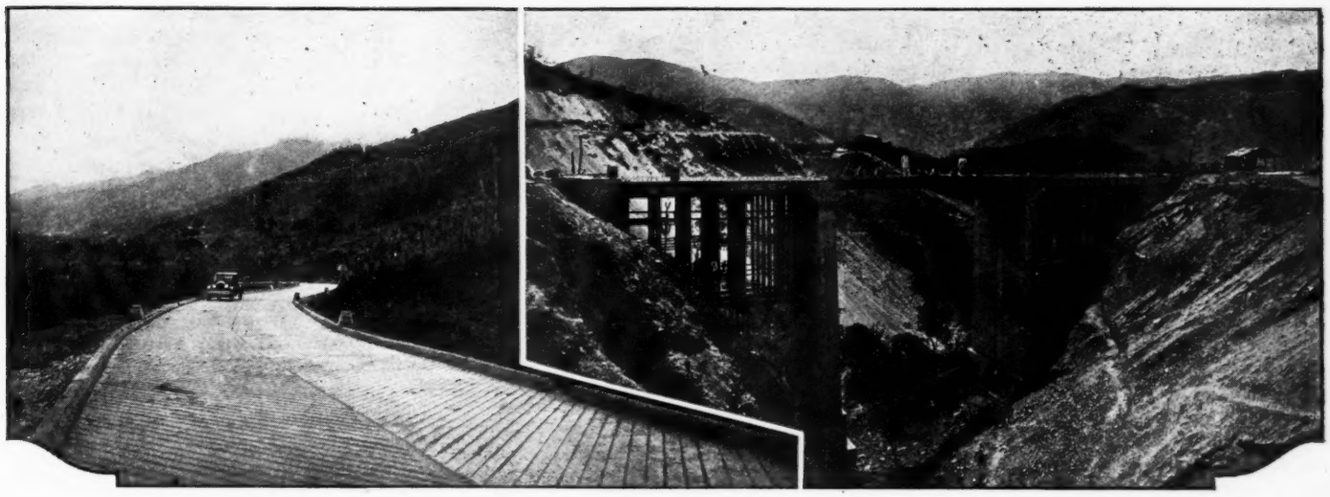
In June, 1925, the latest date for which complete data are available, there were about 3900 miles of highway under construction in Latin American countries and plans had been made for the construction of nearly 16,000 miles additional. This total of 20,000 miles of roads for the future constitutes an increase of 45.5 per cent over the present mileage of 44,000 and, if the ratio of motor vehicles per road mileage can be assumed to remain fairly constant, the number of the former may be expected to increase from 388,000—the Jan. 1, 1926, total—to about 565,000 when all the road construction contemplated at this moment is completed.*

That this prediction is by no means a fantastic one is indicated by an examination of Table 2 wherein are given ratios of highway mileage to population and to area for the various countries of Latin America and for the United States. In the Dominican Republic, Bolivia and Chile the ratio of miles of motor roads to each 1000 of population is 0.8 to 1. These three countries

* Much of the information given herein has been obtained from Trade Promotion Series No. 18, Motor Roads on Latin America, published by the Department of Commerce.



Two views of Brazilian highways, unsurfaced but well drained and passable in all but very wet weather



An example of a paved highway in Venezuela. Note the deep indentations in the surface for better traction and drainage. Right—This bridge itself and the surrounding country afford evidence of the great difficulties which confront road builders in many Latin American countries. This scene is from Venezuela

lead all other Latin American countries in this respect. When their ratio is compared with that of this country, however—25.3 to 1—it is evident that an increase of 177,000 motor vehicles, bringing the average ratio of all the countries up to slightly over 0.6 to 1, should not be impossible.

TABLE I

	Motor Vehicle Registration	Mileage of passable motor roads	Miles of road per motor vehicles
Mexico	41,820	6,869	0.164
Guatemala	993	387	0.390
Honduras	420	195	0.464
Salvador	1,080	352	0.325
Nicaragua	405	221	0.546
Costa Rica	563	117	0.208
Panama	3,407	180	0.053
Cuba	35,000	1,520	0.043
Haiti	1,450	683	0.471
Dominican Republic	3,015	760	0.252
Colombia	3,579	861	0.241
Venezuela	6,540	2,525	0.387
Ecuador	1,160	348	0.300
Peru	7,500	2,897	0.386
Bolivia	1,000	2,216	0.222
Chile	13,714	3,014	0.220
Argentina	173,754	790*	0.005*
Uruguay	23,368	9.02	0.039
Paraguay	730	60	0.082
Brazil	68,903	18,825	0.273
	388,401	43,722	0.113
United States	19,843,936	2,862,198	0.144

In nearly all the countries of Latin America highway construction has been given considerable impetus during the last few years. This is effectively illustrated by the statement just made that mileage under construction and projected is equivalent to 45 per cent of that already completed. In nearly all the countries, prior to the development of railroads, highway systems were at least as good and in some instances were much better than they are now. This was true because roads then constituted the sole means of intercourse between the various towns and sections of a country and were essential to the welfare of its citizens.

Although the advent of the automobile was still decades away—centuries, even, in some cases—the roads were of uniformly good construction and if they had been maintained would have provided excellent foundations for modern automobile roads. With the development of the railroad, however, many of these old roads were no longer used to any extent, were quite neglected by repair workers and finally degenerated into rough trails over which wheeled vehicles could travel only with difficulty in dry times of the year and which were quite impassable during the rainy seasons.

During recent years the increasing number of automobiles operated in the different countries has once more directed the attention of the citizens to the advantages of good highways. Considerable improvement has already been made and the prospects for the future look very bright. More information is being obtained by the governments concerning proper methods of highway construction and maintenance so that roads once built will endure; taxation methods for financing new road projects are being studied and in many other ways the various countries of Latin America are, in general, realizing and anticipating the need for good roads before they can reap full benefits from the use of automotive transportation.

A brief summary of the status of highway work in the several countries may be of interest in indicating the extent to which this activity may provide a future market for American built motor vehicles:

TABLE II

	Area 1000 sq. mi.	Population 1000	Good Motor roads Miles	Roads passable at some time. Miles	Total mileage passable roads	Mile of roads per 1000 sq. mi. area	Mile of roads per 1000 population	Miles under construction or projected
Mexico	768	15,063	519	6,350	6,869	8.9	0.45	4,950
Guatemala	48	2,200	...	387	387	8.1	0.2	348
Honduras	46	680	...	195	195	4.2	0.3	410
Salvador	8	1,500	90	262	352	44.0	0.23	22
Nicaragua	49	690	132	89	221	4.5	0.3	125
Costa Rica	19	475	66	51	117	6.2	0.2	595
Panama	32	446	180	...	180	5.6	0.4	81
Cuba	46	3,123	20	1,500	1,520	33.1	0.52	600
Haiti	26	2,100	284	399	683	26.3	0.34	82
Dominican Republic	19	895	190	570	760	40.0	0.81	420
Colombia	443	5,855	325	536	861	1.9	0.1	1,550
Venezuela	394	2,412	735	1,790	2,525	6.4	0.1	200
Ecuador	120	2,000	...	348	348	2.9	0.2	885
Peru	591	4,500	337	2,560	2,897	4.9	0.6	...
Bolivia	560	2,820	261	1,955	2,216	4.0	0.8	150
Chile	292	3,900	295	2,719	3,014	1.0	0.8	435
Argentina	1,153	9,000	321	469.	790*	0.7	0.1	1,065
Uruguay	188	1,500	270	632	902	4.8	0.6	8
Paraguay	...	1,050	2	58	60	...	0.1	308
Brazil	3,276	30,636	1,475	17,350	18,825	5.8	0.6	7,650
Total	8,078	90,845	5,502	38,220	43,722	5.3	0.5	19,884
United States	3,744	113,000			2,862,198	764.7	25.3	

* No data available for roads passable only in dry season but number is large.

Mexico

The topography of Mexico is such that a central plateau rising from 4000 to 8000 ft. above sea level contains the largest cities, the most important mining and agricultural areas and the bulk of the population. The great problem which confronts transportation engineers here is to connect this area with the seaports. This work is greatly hindered by the fact that at no place is the plateau cut by navigable rivers and all lines of communication must be constructed at considerable expense over a very rough territory. A fairly comprehensive railroad system now connects the plateau with the 15 main seaports.

The present highway system is quite inadequate. Considerable mileages of rather good roads were practically abandoned when the railroads were built and some roads built since then have deteriorated because of lack of money to keep them in repair. In the vicinity of the City of Mexico are a number of good roads and work has been progressing slowly for some time on projects to connect the capital with several other leading cities.

The Federal Bureau of Roads has made plans for a national system of some 4500 miles to radiate from the capital and traverse all the important agricultural and mining sections of the country. Some of these roads are planned to be built over existing routes where only resurfacing and grading will be necessary. Many of the routes, however, must be built in new territories where topographical conditions will make any type of construction very costly. Because of this fact and the further one that the Government does not have at present any great amount of funds for carrying on this work, it is doubtful that the full project will be carried out for many years.

One method by which roads may be built more rapidly than if their construction were entirely based upon Government support, is the plan of giving private concessions for road building to private concerns who charge toll and have exclusive rights to filling station privileges, road houses, etc. An interesting commentary on the dire need for more highways is the fact that while there are some 9500 miles of railroads in Mexico the mileage of highways that feed the rail lines is only about 3800, or less than half.

There are no special Federal taxes assessed for road maintenance. In different States various means are employed to obtain money for road building purposes, ranging from direct assessments against property owners benefiting by the new road to special taxes on all sorts of bases. Motor vehicle taxation has been tried but the returns have seldom been assigned to road work.

Guatemala

The very rough topography of Guatemala has been a strong barrier to highway construction and the roads connecting principal cities pass through deep ravines, over mountain ranges and reach elevations anywhere from sea level to 7300. The highway system follows the French system to a large extent. National roads connect the principal cities of the Departments with each other, with the ports and with the international boundaries. Local roads connect small towns and villages.

The policy of the Government has been to extend highway construction as rapidly as the available funds will permit. These funds are obtained through a national road tax levied on all citizens and graded according to individual incomes. In addition, motor vehicles are taxed and the money so collected is used in highway work.

Honduras

Here, again, the very rough topography, combining mountains with deep valleys and constantly changing levels, has worked against road development. There is a route for freight and passenger traffic between the Atlantic and Pacific oceans which utilizes the one good highway for most of the distance. Construction of new roads is being very well done. National highways are macadamized to a width of 6 meters and are constructed and maintained by the Department of Public Works or by private concerns under contract or concession.

The main sources of revenue for road construction are import taxes, direct taxes, mining taxes, income from concessions, and fines paid by soldiers. No road taxes are levied on abutting property.

Salvador

Salvador has the best highway system in Central America. There are about 350 miles of road suitable at some seasons for motor traffic which connect the mining and agricultural regions with the coast. The macadamized roads are built and maintained by the Department of Public Works. Many rural roads are built and cared for by private land owners by private contribution and by the labor of their employees.

Revenue for road construction and maintenance is obtained from many sources. Licenses for the use of the roads are sold and fines levied. A road tax based upon an individual's wealth or his need for the road provides considerable funds.

Nicarauga

The presence of several mountain ranges separating fertile plateaus and the interior of the country from the coast and from cities has been an obstacle to highway development in Nicarauga. There is no definite plan of highways but considerable mileage is now under construction to connect a number of cities with Managua. All road construction is in the hands of the Department of Public Works and road funds are derived from budget surplus—when there is one.

Costa Rica

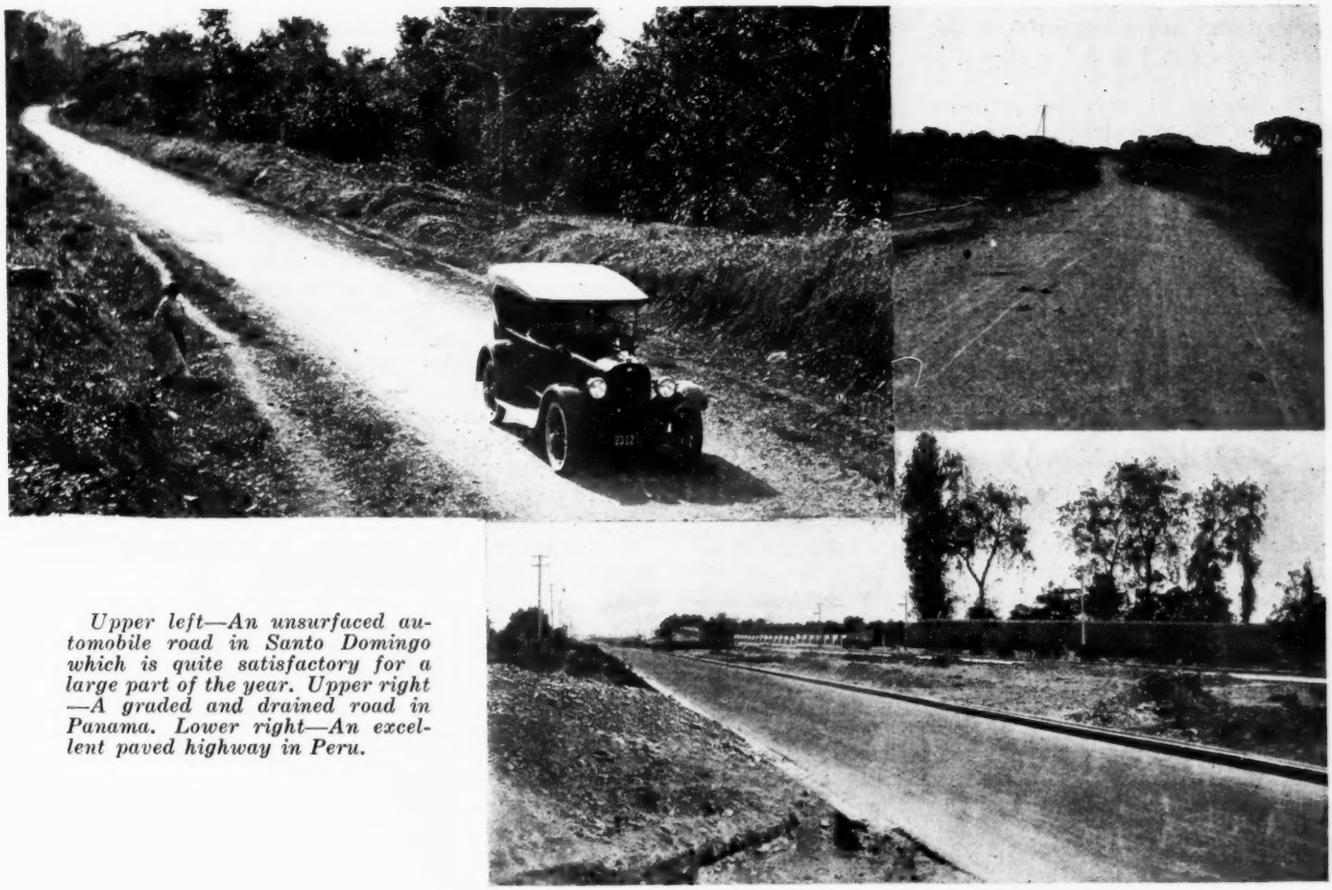
Nearly all of the passable motor roads in Costa Rica have been built since 1920 when the roads then in existence has lost nearly all semblance of a highway because of constant neglect. Since then a highway plan has been developed and a considerable portion of it carried out or now in the process of construction, by which San Jose will be connected with all the important cities and regions of the country. All construction is under the supervision of the National Government and funds are provided by the National Congress which assigns a part of the revenues for this purpose each year.

Panama

Road development in Panama really got under way in 1919 when the first of a series of laws was passed providing funds for highway construction and a definite plan for carrying on the work. There are already about 180 miles of good motor roads and when the 60 odd miles now under construction are completed Panama City will be connected with the principal cities of the country and the rich agricultural regions will open for development. There are two sources of road funds—an annual tax paid by all citizens according to their wealth and three-quarters of surplus revenues which are allotted to this work.

Cuba

Although Cuba has a considerable mileage of passable automobile roads most of them have been built as local projects so that there is little semblance of a national system of highways. At the present time the Govern-



Upper left—An unsurfaced automobile road in Santo Domingo which is quite satisfactory for a large part of the year. Upper right—A graded and drained road in Panama. Lower right—An excellent paved highway in Peru.

ment has a well-developed plan for the construction of roads to connect all the provinces and principal cities. Lack of funds has been the chief deterrent to the progress of this work but when present plans are completed, and the prospects have brightened considerably during the past two or three years, Cuba will have a better highway system than many Latin American countries of much greater size. Highway funds are appropriated from the National Treasury whose main source of receipts is customs duties.

Haiti

During the French control of Haiti a very good highway system was built but it rapidly deteriorated when the French lost control. Since 1915, the beginning of the American occupation, considerable improvement has been made mainly in repairs to the old French roads so that they might be passable for wheeled vehicles. Much of this work was done under the old "corvee" law by which laborers residing in a district where a road is to be built must work on it without pay, receiving only food and shelter. When this law was repealed in 1918 progress slowed up again through lack of funds but improvements are being made constantly as funds become available.

Repair and maintenance work has been carried on with money derived from the general tax levy while new construction has usually been financed by loans. No direct taxes on abutting property or upon motor vehicles is applied to road work.

Dominican Republic

During the last ten years a considerable amount of highway construction has been carried out so that although the system is by no means complete the Dominican Republic is, possibly, a little better equipped with passable motor roads than many of her neighbors. The National Government has jurisdiction over the roads and general taxation and loans for construction purposes provide funds for continuing the work.

Colombia

The rugged topography of Colombia has helped to keep the passable roads clustered around a few of the principal cities and anything like a national system of highways is still in the future. There is a considerable interest in good roads, however, and plans have been made which, upon completion, will connect all the important cities and regions with surfaced highways. As is true in nearly every country of Latin America, lack of funds is the main obstacle to more rapid highway development. Appropriations are made from the national budget for highway work.

Venezuela

In comparison with other Latin American countries, Venezuela has a good road system. It has a total of nearly 1800 miles of roads which are passable at some time of the year. Many of the roads which are quite good during most of the year become impassable during the rainy season because of the lack of bridges over streams which at that time become too high to ford. The government has been carrying out a rather complete program of highway work and the completion of roads now under construction or projected will provide the country with a comprehensive system of highways connecting all the principal cities and the important agricultural and mining regions.

The Federal Government and the several States divide the task of constructing and maintaining the highways. Most of the funds needed are provided by the

former and are allotments of the revenues for public works.

Ecuador

Waterways provide the principal means of transportation in Ecuador and the fact that centers of population are located along the coast or upon navigable rivers has militated against highway construction as well as against railroads. During the last two years interest in road work has increased and at present there are plans to connect the principal cities along the Pacific coast with good motor roads. Funds for the work are obtained by allotment from the general taxation revenues, appropriations by the provinces which will be benefited by the road and by a road tax paid by automobile owners.

Peru

Peru has nearly 2900 miles of motor roads which are passable most of the year and practically all of this mileage is along the Pacific coast. The great variations in topography and climate have effectively prevented any great highway development toward the interior although there are rich agricultural and mining areas to the east which offer splendid opportunities for development with the building of roads to connect them with rail lines.

Along the Coastal plain lies the most highly developed section of the country and it is here that most of the road development has taken place. Large stretches of loose sand have been an obstacle to very long trips and it is only within the last year or two that motor vehicles have attempted to make journeys for any considerable distance along the coast although roads existed.

Only since 1916 has a definite highway policy been formulated and the Department of Public Works is now charged with systematic development of a national highway system. A road labor conscription law provides labor in districts where it is needed and appropriations are made by the government and other funds are obtained locally to carry out the work. Funds are not plentiful, however, and progress is apt to be slow for some time to come.

Bolivia

A great plateau, averaging over 12,000 ft. in height, contains the bulk of Bolivia's population and is the center of the principal industry—mining. It is separated from the Pacific by the Andes and is much broken in contour. In spite of difficulties and expense of road construction, about 2200 miles of roads which may be used for motor vehicle traffic have been built and are now in use. A national road tax and special appropriations, either federal or departmental, provide funds for carrying out the road building program under way now, which calls for about 150 miles under construction or projected.

Chile

Until a few years ago nearly all roads built in Chile were constructed as a part of the military strategy and not to open up undeveloped regions. At the present time more attention is being given to highways as a means of general transportation but there has been no definite program made so that much of the work is not particularly effective in improving the situation. Most of the present roads radiate from the prominent cities along the coast and some of the cities are connected by fairly good highways.

Very little road machinery is used and the custom of the government to use native materials and equipment regardless of their relative price or efficiency has not added to the effectiveness of the money spent.

Argentina

Topographical features of Argentina are generally favorable to the development of transportation facilities. The large expanses of almost level plains, unencumbered with forest growth, can be traversed with motor vehicles during dry weather without regard for highways. During the wet season, however, these sections as well as most of the thousands of miles of roads in the country become quite impassable. Although the value of good roads is generally recognized by the land owners they doubt that their value is equal to their cost and for this reason improvement of the old cart roads has been delayed so that the only good motor roads in existence are located immediately adjacent to a few of the larger cities along the coast.

Difficulty has also been met in finding funds for road construction. Much of the country is made up of vast ranches possible 20 miles or so square. The Federal government has been reluctant to build good roads at its own expense through these ranches and the ranch owners have not been sufficiently sold on the value of highway construction to offer to share the burden. Because of these conflicting interests the progress of highway construction will depend not only upon a sound financial policy but also upon the education of the people in the value of the work.

Uruguay

Uruguay is the smallest country in South America but it has a very well developed system of highways which have been in the process of the construction since 1905 when a definite policy was outlined. Most of the roads are in the neighborhood of Montevideo but there are also several long stretches along the Uruguay River and along the coast line. With one or two minor exceptions all highway work has been funded from the National Treasury since the first road law of 1905 authorized a loan of $3,000,000.

Paraguay

Paraguay is almost devoid of motor highways. In early days a rather comprehensive system was developed but through disuse and lack of care such roads as are still in service are generally impassable for anything except carts and even they often have great difficulties in making progress. In 1924 Congress laid plans for a highway system, funds were appropriated and it may be expected that the next few years will bring decided improvements in the situation.

Brazil

The southeastern sections of Brazil are prosperous and thickly settled and are provided with a highway system which compares favorably with that of other Latin American countries. In fact, the roads of one State—Sao Paulo—may be compared with those of the United States. Good roads connect the cities with the interior and with southern cities and many truck and bus lines are in operation to serve as links between railroads and furnish transportation for regions not served by railroads.

The eastern and northeastern States are not so well equipped with roads but still are considerably better off than many other countries. The interior States have very few good roads and necessity for them is somewhat alleviated by the presence of the great river systems which provide a ready means of transportation.

Brazil is a loosely-knit federation of States in which the States have all the powers not expressly given to the Federal Government. Although there is a Federal Minister who is responsible for public works most of the road construction and maintenance is carried on by the various State departments. Most of the funds needed for the work are provided by the State in which the road is to be built.

Modern Milling Methods Are Applied to Steering Gear Parts

High rate of production attained by fitting power-driven rotating fixture to standard vertical milling machines equipped with rotating table.

By Walter L. Carver

HIGH productive ability, flexibility and economy of operations are combined in two installations which were made rescent for a steering gear manufacturer by the Kempsmith Manufacturing Co. of Milwaukee. In both installations a power-driven rotating fixture is applied to a standard vertical milling machine which is equipped with a rotating table. The standard drive for the rotating table provides for the fixture rotation.

Both installations illustrate the present tendency in design of rotating fixtures. Cutters are placed inside of the fixtures so that the time lost in "cutting air" is reduced to the minimum. In the earlier applications of the rotating fixture idea, parts were attached to the outside of a drum with the surfaces to be machined extending outwardly. Loading was complicated and a relatively small portion of the mean travel of the circle taken through the center of the machined surfaces was utilized in effective cutting work.

By turning the surfaces to be machined toward the center of the fixture, they are brought together with very little space between them. Therefore, for a given travel past the cutters more pieces are machined. Loading is simplified by unobstructed clamping devices on the outside of the fixtures. Pieces are held more rigidly and safety conditions are improved.

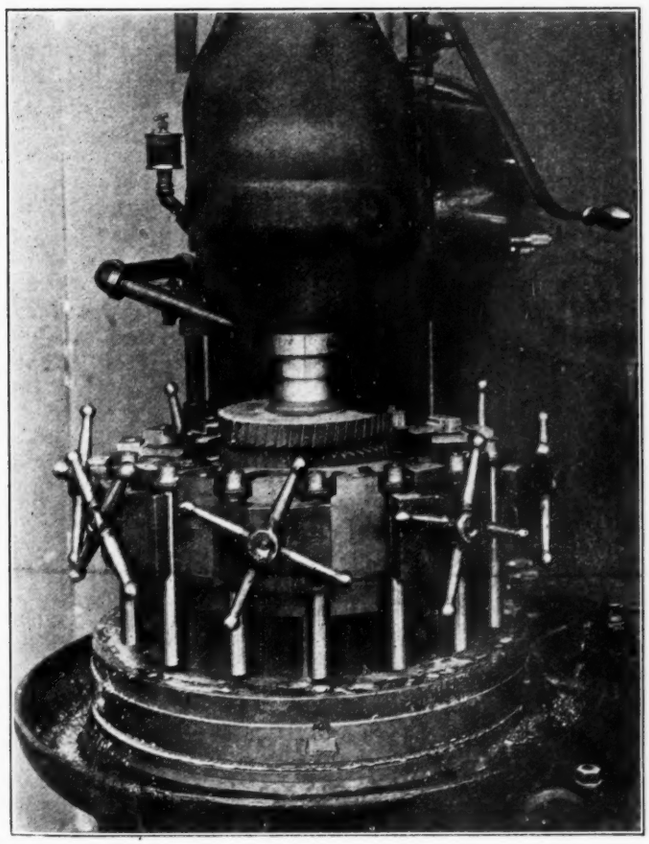


Fig. 1. Straddle milling operation on a fork which is forged integrally with a shaft member

Straddle Milling Operation

Fig. 1 illustrates a straddle milling operation on a fork which is forged integrally with a shaft member. As shown, these forgings which have previously been turned on the shaft portion, are clamped in vee slots in the body of the fixture by dual equalizing clamps. Fork portions are backed up by surfaces machined in an annular plate which forms the top of the fixture. This plate is thinner than the span between the cutters and passes between them. Two 10 in. half side milling cutters running at a peripheral speed of 3 f.p.m. remove from 1/16 in. to 3/32 in. of stock from each side of the forks and maintain close limits. The fixture holds 26 pieces and is rotated continuously. The production rate is 400 pieces per hour and is dependent upon the ability of the operator to load the fixture. A line drawing of the tooling is shown in Fig. 2.

Following this operation the same forks are slot milled in a similar machine equipped with another rotating fixture as shown by Fig. 3. In this instance, the shanks of the forgings are clamped individually in a horizontal plane with the forks projecting inwardly. Vee slots in the body of the fixture are used again, the clamps have double toes

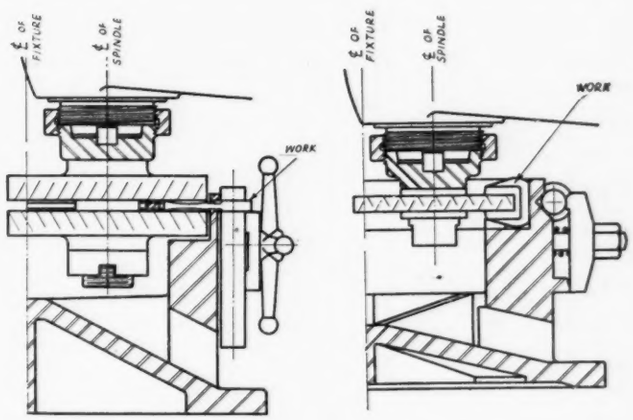


Fig. 2. Tooling for the straddle milling operation

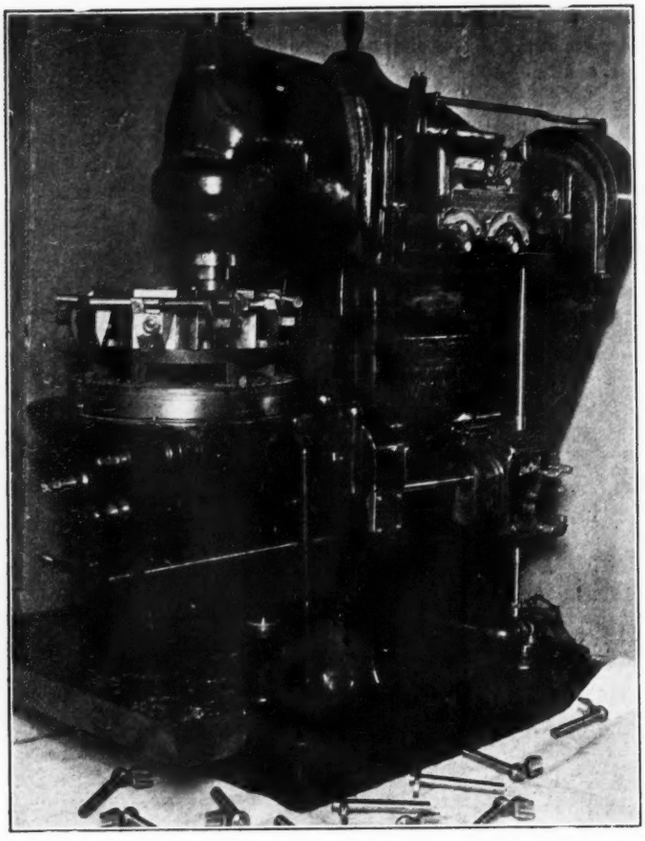


Fig. 3. Slot milling the forks. An operation for which another rotating fixture is used

and a nut replaces the handwheel. In this set-up, a 10-in. diameter alternate tooth side milling cutter removes from 3/32 in. to ⅛ in. stock from the sides and bottom of the slot. Twelve stations are formed on the fixture and the production rate is 300 pieces per hour. Fig. 4 is a line drawing of this set-up.

Particular attention has been devoted to rigidity of the structure of the fixture and clamping means to insure high production with the absence of vibration and chattering. The flexibility of these combinations is shown by the fact that four different sizes of trunnion shafts are machined on these two No. 2 vertical millers.

Holt Traces Tractor History

AN outline of the early history of the tracklayer type of tractor was given by Pliny Holt in a paper read at the spring meeting of the American Society of Mechanical Engineers held at San Francisco June 28-July 1.

Most of the development work on high power steam and gasoline traction engines took place on the Pacific Coast, which was due to the fact that in that part of the country agriculture was carried on on an immense scale by large landholders, and labor was scarce. This led to the use of implements such as plows and harvesters in large gangs, hauled by large teams of horses, so that a large amount of work could be accomplished with a small number of men.

Two men stood out as pioneers in this development in the West, namely Daniel Best of San Leandro and Benjamin Holt, of Stockton, Calif. Both developed heavy duty steam tractors which came into use during the latter part of the nineteenth century pulling large gang plows and other farming equipment, hauling lumber and ore in roadless districts and doing pioneer construction work.

While these tractors were successful during the six months of the dry season, they could not operate successfully in winter on account of the mud or slippery sod, and they were impractical in all seasons on sand.

The limitations of the wheeled tractor were brought to the attention of the Western manufacturers when attempts were made to harvest and operate on the reclaimed peat lands of the lower Sacramento and San Joaquin rivers. These lands were very soft and practically bottomless, and the use of the conventional wheel-type tractor was out of the question.

It was while working on this problem that Benjamin Holt in 1900 conceived the idea of the Caterpillar tractor. He built a pair of tracks, or "platform wheels" as they were then called, and installed them on an existing steam tractor. It was more or less of a makeshift, practically all of the parts being picked from among old material around the plant, but the results were so encouraging that another tractor was built.

Value Not Fully Realized

At first the wide field of usefulness of the new machine was not fully realized, but the advantages of the tracklayer type were forcibly brought home to Mr. Holt and his associates by a case which occurred near Stockton, where one of their 40 hp. caterpillar tractors succeeded in pulling the loads formerly hauled by one of their 60 hp. wheeled tractors. The little machine proved capable of pulling four gang plows when set to plow 2 inches deeper than with the wheeled tractor. From this experience the conclusion was drawn that the tracklaying type of tractor was more efficient than the wheeled type, the resistance to its motion being practically independent of the character of the soil.

At the outbreak of the world war the tracklayer tractor had reached a fairly advanced stage of development, so far as actually doing work was concerned, but little attention had yet been given to the problem of economical operation.

Some years before the war a number of machines had been purchased by Austro-Hungarian land owners, and these apparently were being used in the war by the Central Powers. One of these machines was captured by the British during the early part of the war, and it was this incident that led to the development of war "tanks" by the British. The British War Office immediately got in touch with the Holt Mfg. Co. and arranged for the purchase of as many caterpillar tractors as they could get. One of the first machines shipped on this order was one which had originally been ordered before the war by Emperor Francis Joseph of Austria. When the war broke out it was standing on the dock in New York, awaiting shipment. Representatives of the Holt Mfg. Co. uncrated it, removed the insignia of the Austrian Emperor, repainted it in plain colors and shipped it to England.

During the war and up to 1921 the tracklayer type of tractor was developed intensively by the engineers of the allied and American Governments and those of the various companies engaged in its manufacture. One of the results of this development work is that the latest model of caterpillar tractor has 4000 fewer parts than the war-time tractors of that make. Since the close of the war the U. S. Government has not ceased to follow closely the progress in tracklayer type tractors, and an officer of the Ordnance Department experienced in tractor and tank work is permanently stationed at San Leandro as a point of contact between the War Department and the manufacturing company.

THE FORUM

Supercharging and Thermal Efficiency

S. R. Treves replies to criticism of his article on the thermodynamics of supercharging

Editor AUTOMOTIVE INDUSTRIES:

The objections raised by you to the values of the brake thermal efficiency arrived at in my calculations on supercharged engines in your issue of June 10 are essentially the following three:

(1) It is not permissible to assume the same compression ratio for supercharged and non-supercharged engines.

Yet, this is justified by the fact that the study turns upon one and the same engine operating at the various degrees of supercharging, i. e. at 1.2, 1.4, 1.6 atmospheres, and it is then quite natural to extend the study to the extreme case too, in which the supercharge, all other conditions being equal, reduces to naught. Besides, as was mentioned in my paper, thanks to the employment of special spark plugs and fuels, and especially to the presence between the supercharger and the engine of the air cooler, which reduces the temperature of the intake charge at the beginning of the compression stroke to the same values as are attained in a non-supercharged engine, and therefore prevents detonation, it has always been possible to use for supercharged engines the same compression ratios which had to be used for non-supercharged engines.

Powers to Drive Supercharger

(2) The power required to drive the supercharger is the greater, the higher the pressure of supercharging. But this does not directly influence the brake thermal efficiency, because—as is clearly shown in my article—with decreasing supercharge pressures, the compression ratio remaining the same, not only the power N absorbed by the supercharger decreases, but also the effective power N_e of the engine, and the theoretically obtainable power N_t. Thus it is not possible to state *a priori* how the ratio $(N_e—N_c)/N_t$ will vary.

(3) As to the proportionality between the fuel consumption and the square root of the density of the compressed intake air, this is the result of a theoretical reasoning, based on otherwise equal conditions, as is clearly stated in the text of the article. It is evident that if we assume that the engine, when not supercharged, already has the highest attainable compression ratio and the most economical proportion of the mixture, then, with a supercharger applied, it would be necessary to enrich the mixture in order to counteract overheating.

In conclusion, it can be stated that the values for the thermal efficiency relating to the different supercharging pressures, which do not sensibly differ from 0.24, correspond approximately to a specific fuel consumption of 260 gr./hp.-hr. (assuming the calorific value of the fuel to be 10,200 cal/kg, as in the paper), and this value is in accord with the values practically obtained on the brake.

S. R. TREVES,
Mechanical Engineer, Fiat Co.

Trucks in South Africa

Editor AUTOMOTIVE INDUSTRIES:

I must take exception to certain statements in the article written by Mr. Edward and published under date of April 8, 1926.

In the first place, Mr. Edward states that more motor trucks of 2 or 2½-ton capacity were sold in South Africa three years ago than since. This statement is rather doubtful, and if it is so it is not due to the victory of the steam wagon, but to conditions prevailing at that time, as you are no doubt aware there were many motor trucks disposed of by the British War Office.

Taking it year in and year out, there are more heavy duty trucks shipped to South Africa than there are steam wagons, and the American machine is more than holding its own.

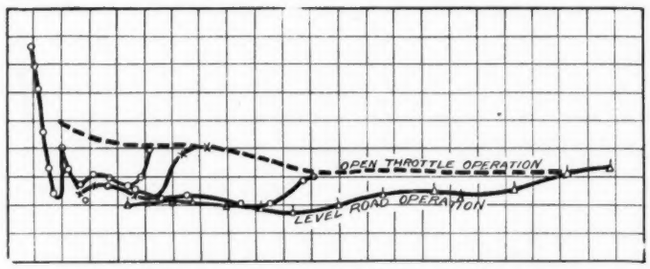
Mr. Edward makes the assertion that the steam wagon is more economical. I would like him to give us some figures regarding cost of operation. Admitting that gasoline is more expensive, he did not state that it was necessary to employ two men when operating steam wagons. Taking everything into consideration, I feel sure that the American heavy duty truck can more than hold its own when operating in severe tests.

While granting that the steam wagon is employed very much by the South African Railways in Johannesburg and Durban, it is only in cases where the roads are good, while day in and day out our American heavy duty trucks are breaking the trails and doing their work 100 per cent.

I think that Mr. Edward contradicts himself very much, as in the first place he says that our roads are what we would call trails at home and he is recommending the speedy so-called light truck up to 2½ tons capacity. How long does he expect these so-called speedy trucks to stand up over such trails?

H. INGHAM
International Harvester Co.,
Cape Town, South Africa.

New Tillotson Carburetor Has Economizer Feature



Performance curves of Tillotson carburetor

ALTHOUGH the fuel content of the mixture is leaned with the engine operating at normal road speed, the new SE-5A plain tube carburetor now in production by the Tillotson Mfg. Co., Toledo, Ohio, permits the delivery of maximum power at full loads of the engine whether the engine is laboring or operating at high speed. The economizing device located in the upper half of the carburetor embodies several new features which make for high fuel economy throughout the range of part throttle speeds.

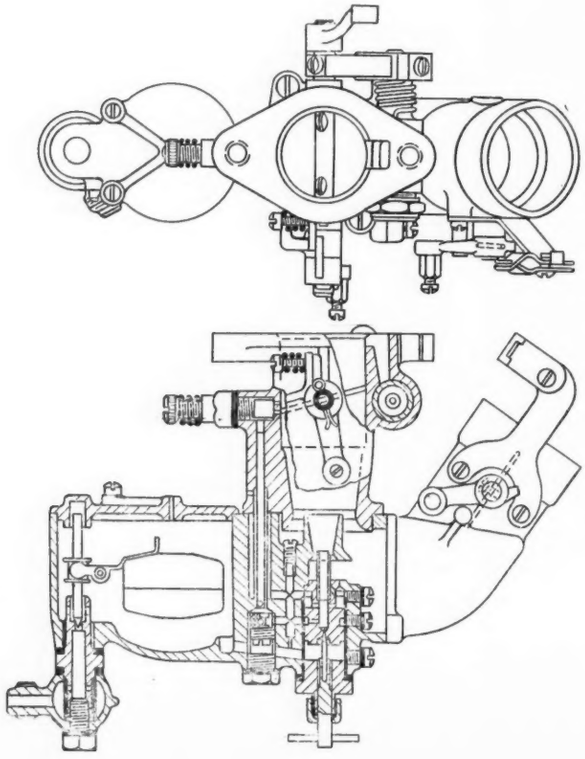
Controlling of the mixture in proportion to the engine load is the main feature of the economizing device, this being accomplished partly by the carburetor throttle but chiefly by the intake manifold pressure. The device comprises a throttle-operated hollow cylinder which opens along an element of the cylinder and communicates to the intake manifold just above the carburetor throttle. A spring loaded plunger which closes when the manifold vacuum reaches a certain minimum value is placed inside the hollow cylinder.

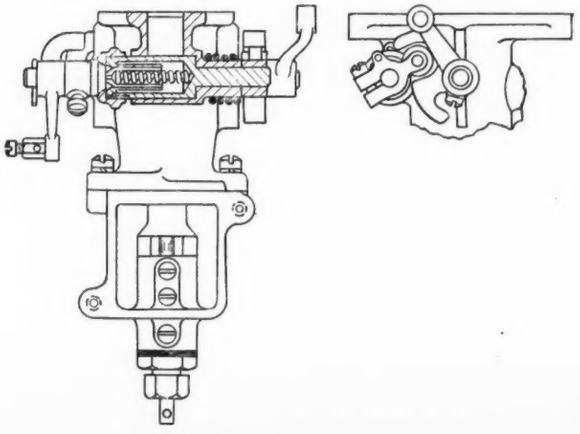
In operation, the economizer cylinder is rotated as the throttle is opened with the result that the high vacuum in the manifold induces a small air flow at high velocity through the economizer opening. With greater throttle opening the manifold vacuum decreases and the economizer opens a greater area and more air is induced through the cylinder. At full throttle position the manifold vacuum approaches zero and the spring loaded valve closes the exterior opening of the economizer and the carburetor again functions as a plain tube unit. At idling the operation of the unit is effected in the normal way.

A sectioned view of the carburetor shows that the general interior construction does not depart materially from other types of Tillotson carburetors. The main nozzle placed in the small choke tube embodies the usual air bleeding control with the amount of fuel supplied to the main nozzle governed by an adjustable needle extending through the bottom of the carburetor body. The idling device is constructed with two emulsion delivery holes, one of which is located above the throttle and the other just below the throttle lip, the latter being employed to prolong the emulsion flow. An adjustable air valve opening to the atmosphere controls the amount of emulsion passing through the idling apertures. As small holes are necessary at the lower end of the idle fuel supply tube in plain tube construction, a screen was added to insure clean fuel at this point which also eliminates much of the erratic idling of the engine.

While plain tube type of construction usually results in good atomization, some portions of the fuel tend to coalesce on the throttle disk and flow up along the manifold walls. To overcome this the economizer is designed so that any fuel coalescing on the disk or walls is agitated and reatomized by the turbulence set up from the entering air stream. Roughness of engine operation due to the surging of wet fuel in the intake manifold caused by vibration is minimized by the increased atomization. As the economizing action does not necessitate a change in the pertinent proportions of the idling or highspeed nozzles, the leaning of the mixture is affected only where desired.

The design of the carburetor lends itself to low cost production as the two larger parts are die-castings with the smaller pieces of extruded metal or screw machine products. Both the float bowl and the lower half of the body form one casting while the upper half carrying the main venturi, forms another. Both float cover and air horn also are diecast.





Assembly and detail views of new Tillotson carburetor

EDITORIAL

Short-Term Buying

SHORT-TERM buying once was considered as a sort of catastrophe. When automobile manufacturers along about 1922 began purchasing on a shorter term basis than had previously been their custom, parts and supply makers generally agreed that the practice was unfortunate and detrimental to their interests.

But short-term buying continued. It has proved a blessing in disguise in many ways. It has necessitated more careful production planning, has resulted in much more rapid inventory turnover, both in vehicle and parts plants, and has made possible thousands of dollars of savings in inventory investment. The practice can be carried to extremes, of course, and the parts maker up to the present hasn't benefited to the extent the vehicle manufacturer has, but at least it isn't considered as terrible a thing today as it once was.

An interesting commentary is contained in a recent *Iron Age* editorial which says, "Short-term buying has been demonstrating to the steel industry that high production is possible without large backlogs. At no time during the past 12 months has there been heavy forward buying; yet steel ingot output during the year ended May 31 was the largest for any 12-month period. Cautious buying has become an accepted condition in the market and has begotten circumspect production."

Practices inaugurated for one purpose frequently lead to the achievement of unpremeditated although desirable ends.

Discriminating Against Buses

IN the London and Home Counties Traffic Advisory Committee the operators of traction lines in London have a supporter which has given the electric lines a new lease of life just as they apparently were about to expire. As a result of recommendations made to the Ministry of Transport by the Committee, the number of buses operating in the Metropolitan Police District has been considerably lowered within the past few months and their patronage transferred to tram lines.

The interesting thing about these recommendations is that, in the words of the Committee, they were made ". . . as a means whereby immediate relief could be given to the tramways" and not because the buses were failing to give complete and satisfactory service. On the contrary, the buses were proving so satisfactory to the Londoners that tramway revenues have dropped until there was a loss of about $600,000 in the operation of public owned lines during the fiscal year 1925-26 and an anticipated loss of over $1,500,000 for the present operating year. The Committee is of the opinion that these increasing losses are almost entirely due to bus competition or, in other words, that buses are proving so desirable as means of urban transportation that electric lines are being seriously neglected by city travelers.

The fact that about $105,000,000 of the $130,000,000 total investment in the tramways of London has been furnished by the London County Council and other local authorities is undoubtedly a potent reason why the Traffic Committee has been so interested in conserving the profits of the lines even at the expense of running contrary to public desires. It will be interesting to observe the success with which this Volsteadian regulation will be met.

How Many Models?

ALMOST a definite cyclical trend might be traced within various individual companies as regards number of chassis models. Going back over a long period of years, we probably would find that many organizations have started out with one or two chassis models, increased the number to five or ten, and then gone back to a very small number.

With a small range of chassis and body models, the salesman for a particular car inevitably sees a certain number of sales slipping away from him because a particular prospect wants something a bit different from what he has to offer. No manufacturer likes to see somebody else selling a car which he feels he might have sold. So he gradually puts on another model and then another, reaching out in an attempt to please more people. Just as gradually, production costs mount, dealers begin to protest about heavy inventories or inability to stock all models, and finally a limit is reached.

The companies with the fewest models have made the greatest success from a quantity and frequently from a financial standpoint. But obviously, the low-priced, quantity field is not for everyone. Some manufacturers can reasonably expect to do a good business just by trying to please the fellow who wants something a little different. The big questions in any given case, however, are: "When shall we stop expanding the number of models? When does the type of person pleased by an additional model become so few in number as to be economically unimportant?"

Possibly such questions have been answered in the past too frequently on the basis of emphatic statements from a few field sources and not frequently enough by attempting some sort of statistical sampling.

AUTOMOTIVE NEWS SECTION INDUSTRIES

Philadelphia, Pennsylvania

Thursday, July 1, 1926

Heavy Retail Sales Continue; Plants Make Readjustments

PHILADELPHIA, July 1—As a number of the largest plants have been partly or wholly closed down for inventory and machinery changes production of automobiles in the last two weeks have been at the lowest point for several months and it is expected that the figures will show a heavy decline from the May total. This recession is seasonal, however, and does not mean any serious slump in sales.

With production at a comparatively slow rate, the retail end of the industry is rapidly cleaning out stocks of new cars and endeavoring to make inroads on the surplus of used cars. While the latter effort is being attended with some success, the situation is by no means satisfactory. If, however, sales continue on a good level, the better class of merchants will soon be able to get down to normal so far as the second-hand vehicles are concerned.

Save for the accumulations of used cars, the industry this year has been following a sound and orderly course. The selling season was not disturbed by general price changes; the reductions or advances that have been made were in the nature of readjustments that did not necessitate similar action by competitors. Similarly no new models were announced during the period of heaviest sales. Both factors have helped to maintain production on an even and profitable basis.

The prospect is for an advance in production in the next twenty or thirty days which will be coupled with some unusually interesting announcements from the factories. Automotive leaders, both in the car and truck ends, see no reason for not expecting a satisfactory second half year.

Foreign sales are maintaining a good margin over last year's figures, and predictions are made that the total for the year will be about three-quarters of a million cars and trucks, as compared with 536,000 for 1925. The introduction by American manufacturers of vehicles more along the lines of those produced abroad should be of immense stimulus to the export market.

Graham and Hall Abroad

CLEVELAND, July 1—George M. Graham, vice-president of the Chandler-Cleveland Motors Corp., of Cleveland, is sailing for Europe this week. While his itinerary has not been announced, it is understood that Mr. Graham will visit most of the European countries. His trip is announced as a vacation.

J. R. Hall, vice-president and factory superintendent of the Chandler company is now in Europe. Both executives are expected to return to the Cleveland plant early in August.

Exports to Canada Double in 2 Months

WASHINGTON, July 1—Exports of passenger cars from the United States to Canada more than doubled since the lowering of the import duty on April 15. For April exports were 2688 as against 1099 in April, 1925, the valuation increase being from $1,086,949 to $2,079,434. In May exports were 5358 compared with 2675 in May, 1925, the valuation increase being from $2,485,746 to $4,317,537.

Practically all the gains were scored in the less than $1200 class which under the new Canadian tariff pays a duty of 20 per cent as against 35 formerly. Totals in this class were 2484 in April as against 833 in the previous April, and 4818 in May as against 2164 in the previous May. In the $1200 to $2000 class exports in April and May this year were lower than in these months in 1925, indicating that the minor tariff reduction affecting this class influenced the increased buying in the more favored lower priced groups.

Goodrich and Goodyear Down for Inventories

AKRON, July 1—The tire and tube departments of the B. F. Goodrich Co. have closed down until July 6 for inventory and the Independence Day holiday. More than 3000 workers have been granted vacations, many of them receiving full pay.

All departments at the Goodyear Tire & Rubber Co. plant were shut down June 28 and 29 for inventory. The tire and tube departments resumed June 30 and will continue on a curtailed basis until July 6.

Goodrich, Goodyear and other plants are preparing to increase tire production after the holiday.

Will Pay 25% on Claims

DETROIT, June 29—Payment of a preliminary dividend of 25 per cent on claims against the defunct Detroit Electric Car Co., amounting to $209,744, was authorized in circuit court here. Payment of the dividend is to be made out of the proceeds of the sale, Nov. 27, 1925, of the company's assets to William C. Anderson, a member of the board of directors for $75,000. Claims of $7906 have been disallowed, and the dividends to be paid will apply to $201,838 of the claims submitted.

G. L. Bixby, F. E. Price, E. C. Freeman and Anderson, a majority of the board of directors, on Sept. 10, 1925, filed the petition in circuit court for a dissolution of the corporation. The petition was granted and Harry G. Schmiel was named receiver under $50,000 bond.

Appraisal of the business was set at $154,565.51. The court ordered it sold to satisfy claimants.

Steel Pier Display is Opened by GMC

ATLANTIC CITY, July 1—One of the gala events of the season was the formal opening here, today, by the General Motors Corp. of its permanent exhibit on the Steel Pier and boardwalk, where all the products of the corporation will be shown.

The opening was participated in by city officials of Atlantic City and executives of the corporation. Following a dinner at Haddon Hall, a spectacular parade was held to the pier where the mayor turned the keys of the city and the pier over to A. H. Swayne, director and vice-president of the corporation, who officially represented General Motors at the opening.

The events which followed were broadcast from station WPG. A feature of the opening was the attendance of dealers within a radius of 300 miles of Atlantic City, handling all the products of the corporation.

A building 57 x 293 ft. is utilized to display the automobiles and other automobile products as well as electric refrigeration and other products manufactured. The exhibit has been arranged and will be in charge of B. G. Koether, of the advisory staff of the corporation.

Chrysler Advises on "50"

NEW YORK, July 1—Stockholders of the Chrysler Corp. have been advised by W. P. Chrysler, president, that the company is soon to bring out a new four-cylinder car which will be known as the Chrysler "50," according to reports carried on the stock-ticker this week.

Flint Meeting Postponed

FLINT, July 1—Lack of sufficient shares to vote the proposed sale of the Flint Motor Co. plant to the General Motors Corp., caused the stockholders' meeting scheduled for today, to be adjourned until July 15.

Warner is Selected Navy Aviation Head

S.A.E. Council Member is First of Three Department Air Chiefs Nominated

WASHINGTON, July 1—The nomination of Edward P. Warner, professor of aeronautics at Massachusetts Institute of Technology and a member of the council of the Society of Automotive Engineers, as assistant secretary of the navy in charge of aviation, was made public by President Coolidge today. The appointment is the first to be made under recent legislation providing for expansion of the air services of the army and navy and for creation of a bureau of civil aeronautics in the Department of Commerce. Assistant secretaries in charge of aviation will also be named in the War and Commerce Departments.

Mr. Warner is known as an authority on aerodynamics and aeronautical engineering, specializing in this field for ten years during which time he has studied aviation abroad and in the United States. During the investigation by the President's air board last winter he testified as an expert and has appeared many times before the general board of the navy.

In addition to his aeronautical studies, Mr. Warner has been known in the industry for his extensive research activity. As an S. A. E. member he has been a frequent contributor of papers at national and sectional meetings on many subjects of interest.

Four Navy Contracts Awarded

WASHINGTON, July 1—Contracts aggregating $1,688,620 for airplane engines and parts were awarded today for the Navy. Packard Motor Car Co. will manufacture 44 engines and spare parts at a cost of $645,000. The Chance Vought Corp. was awarded contract for $259,708 for 20 combined pursuit and spotting aircraft. To the Loening Aeronautical Engineering Corp. was awarded contract for 27 airplanes of three-seater speeder amphibian type to cost $568,000 and spare parts totaling $131,000. Wright Aeronautical Corp. will make 11 engines and parts costing $64,442.

30 American Cars Shown in June Show at Geneva

PARIS, June 23 (*by mail*)—With 30 car manufacturing firms exhibiting, America was second only to France, with 38 firms, out of a total of 227 exhibitors, in the Geneva automobile show which closed its doors Sunday. The exhibition, while not having the mechanical novelties expected at the Paris and London shows, was commercially of considerable importance and united buyers in large numbers from central Europe. In addition to America and France; Germany, Switzerland, Austria, Italy and Belgium were represented.

A new exhibition hall, costing 2,200,000 (Swiss) francs was used for the first time. To construct this, a company having a capital of one million (Swiss) francs was formed, and 250,000 francs of the capital were subscribed by the Federal State and local communes. Total area of the exhibition buildings is 153,000 sq. ft. of which 86,000 comprise the ground floor of the main hall and 39,800 ft. are galleries. The date of the show was dependent on the completion of the exhibition, but next year it is proposed to hold the Swiss show at the beginning of the season, probably in March or April.

Drivurself System Launches Operations

NEW YORK, July 1—John Hertz, of Chicago, announced yesterday the formation of the Hertz Drivurself Stations, Inc., a $2,500,000 corporation which will be the operating unit for the recently organized $30,000,000 Hertz Drivurself Corp.

Mr. Hertz describes the new corporation as the latest step towards unified operation on a national basis of the automobile renting business. It will take over the business of the Yellow Drive-It-Yourself System which now operates 7000 automobiles in 35 separate renting stations in Chicago, New York, St. Louis, Cleveland, Newark, Louisville and Milwaukee.

Arrangements have been made to begin operations at once in Buffalo, Rochester, Syracuse and Cincinnati, and plans call for establishing branches in every city of more than 25,000 population in the states of New York, Illinois, Indiana, Ohio, New Jersey, Wisconsin and Missouri. Cars rented at mileage rates in one city may be checked in at any other station. Registered patrons will be entitled to rent cars anywhere the company has a branch with a minimum of red tape.

Stutz Road Chiefs See Good Summer Business

INDIANAPOLIS, June 25—Optimism and confidence over the outlook for the automotive business of the summer months were expressed and implied by district road managers of the Stutz Motor Car Co. of America, Inc., during a three-day convention called at the Indianapolis headquarters last week.

Vice-president E. S. Gorrell had his managers give to their territories a searching analysis and their assembled reports from Maine to California, from Canada to Mexico City, were assurance sufficient for a high production schedule of the new safety Stutz continuing over the summer months.

Harrison Passes 5,000,000

ROCHESTER, June 28—The Harrison Radiator Corp. which 15 years ago started business in a small way at Lockport, has passed the 5,000,000 production mark. In the first year of its existence the firm produced 240 radiators and employed 18 men. Today it employs over 1500 men and is Lockport's largest industry.

Business in Brief

Written exclusively for* AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co., second largest bank in America.

NEW YORK, July 1—Some increase was noted in retail buying last week, resulting mainly from widely advertised sales by large concerns, but wholesale trade continued to mark time. Rains have further improved the crop outlook. The level of wholesale commodity prices advanced, while stock prices receded.

CAR LOADINGS

Car loadings for the week ended June 12 again exceeded the million mark. The total of 1,060,214 compares with 945,964 during the preceding week and 989,873 in the corresponding week last year. The total number of loadings since the first of the year shows an increase of 2.5 per cent over 1925 and of 7.3 per cent over 1924.

FISHER'S INDEX

Fisher's index of wholesale commodity prices stood at 142.0 last week, as compared with 143.8 in the preceding week and 129.8 four weeks earlier.

Loans to brokers and dealers made by member banks of the Federal Reserve system in New York City increased from $2,517,410,000 to $2,532,898,000 during the week ended June 23.

BANK DEBITS

Bank debits to individual accounts reported to the Federal Reserve Board for the week ended June 23 were 2.7 per cent below the total for the preceding week but 11.1 per cent above that for the corresponding week a year ago.

FEDERAL RESERVE STATEMENT

Bills and securities held by the Federal Reserve Banks increased $900,000 during the week ended June 23, the decline of $99,100,000 in the holdings of Government obligations being more than offset by the increase of $85,800,000 in discounts and $14,100,000 in open market purchases. Note circulation declined $5,400,000 and deposits $32,700,000, while reserves rose $11,200,000.

Loans of reporting member banks decreased $110,000,000 during the same period. Loans secured by stocks and bonds increased $54,000,000, while loans secured by Government obligations decreased $7,000,000 and "all other" loans $157,000,000. Investments declined $27,000,000 and net demand deposits $229,000,000, while borrowings from the Federal Reserve Banks rose $79,000,000 and time deposits $4,000,000.

Call loan rates ranged from 4 to 4½ per cent last week as against 3½ to 4 per cent in the preceding week. Time loan rates continued unchanged at 4⅛ to 4¼ per cent. Rates on commercial paper also remained at 3¾ to 4 per cent.

Harley Uses Ricardo Head

MILWAUKEE, June 28—Harley-Davidson Motor Co. has adopted the Ricardo type of combustion chamber for its new motorcycle, manufacturing under license from the Waukesha Motor Co.

GMC Divisions Get $40,000,000 for 1927 Expansion Program

Approximately $18,000,000 to be Spent by Chevrolet, Buick and Oakland—Drivurself Takes $10,000,000—Frigidaire Gets $12,000,000—$5,000,000 for Flint Body Plant

DETROIT, July 1—In a statement to the stockholders, issued today, Alfred P. Sloan, Jr., president of the General Motors Corp., outlined the extent of General Motors developments which are being made this year.

Increases in its operating program which will be developed over the coming months involve an expenditure in plant and equipment of approximately $40,000,000. To this must be added the working capital necessary for operating purposes.

"There has been authorized an expenditure of approximately $8,000,000 to provide additional capacity for the Chevrolet division. This division, as well of course as its dealer organization, is losing sales in substantial volume on account of present limited production facilities. Further, it is believed that much additional business can be created through still more intensive development.

"At Pontiac there will be expended approximately $5,000,000 by the Oakland division for the purpose of creating additional capacity for the Pontiac. The splendid manner in which the Pontiac has been received by the public, together with the increase in demand for its companion car, the Oakland, necessitates and justifies this development.

"Some months ago there was authorized additional facilities for the Buick division. This will become available July 1 and will result in substantially increasing the capacity of Buick cars. Approximately $5,000,000 additional has now been authorized to create body building facilities in Flint. One-half of the Buick closed bodies now built in Detroit will hereafter be built in Flint.

Plan 2000 Frigidaires Daily

"Sales of Frigidaire, manufactured by the Delco-Light Co., Dayton, Ohio, have increased so rapidly that there has been authorized an expenditure of $12,000,000 to double the present plant facilities. This will provide 2000 Frigidaire units per day.

"Announcement was made about a year ago of the acquisition of a substantial interest in the Yellow Truck & Coach Mfg. Co. Your officers felt that it was essential to be very importantly engaged in the manufacture of buses, as well as broadening the position in the truck and commercial field generally. The development of the operations of that institution has necessitated further enlargement of its capital structure to provide necessary plant facilities. This will involve an additional investment of substantially $10,000,000—perhaps somewhat more. Included in this program is the organization of an entirely new system of motor car transportation for which purpose the Hertz Drivurself Corp. will be formed.

"The outline presented above would not be complete without specifically emphasizing two important phases. One is the diversity in nature of the various developments herein outlined. What your corporation contemplates doing in other words is: (a) Extending somewhat its facilities in motor car manufacture to take care of a substantial and already demonstrated increased demand for its products; (b) creating a new system of motor car transportation which will result in substantial profit as well as in extending the sale of General Motors products, both directly and indirectly; (c) effecting important improvements in efficiency of operation through better coordination of chassis and body manufacture and (d) last but certainly not least, maintaining, and I feel sure, improving its position in the rapidly developing new industry—electrical refrigeration.

"The second important phase of the picture presented is the fact that the financial structure of your corporation is exceeding strong and all these projects will be safely undertaken without in any sense impairing the corporation's present financial stability or without the necessity of any additional security offering of any kind or description."

CHEVROLET TO SPEND $8,000,000 ON PLANTS

DETROIT, June 28—About 60 per cent of the total expenditure of $8,000,000 to be made by Chevrolet Motor Co. in plant expansion will go for new equipment for the seven manufacturing plants at Flint, Detroit, Toledo, Bay City, Cincinnati, St. Louis and Janesville, Wis. The entire development is intended to give Chevrolet capacity for 1,000,000 cars a year.

Operating Losses Lead to Finance Company Sale

BALTIMORE, June 28—Negotiations have been closed providing for the sale of the Mortgage & Acceptance Corp. to the Commercial Credit Co. In a statement issued by the Mortgage & Acceptance Corp. it is set forth that for several months the company has been operating at a loss and it became evident to the board of directors that unless additional capital could be secured the business must be liquidated. The board of directors ratified the terms of the sale, the same action having been taken previously by the Commercial Credit Co. An exchange of securities with a market value of approximately $2,000,000 is involved.

The agreement provides that for every seven shares of Mortgage & Acceptance Corp. first preferred stock, the Commercial Credit Co. will give two shares of its 6½ per cent first preferred stock and three shares of common stock. The stockholders of the Mortgage & Acceptance Corp. who elect to accept the proposal must deposit their certificates with the Commercial Credit Co. by July 10.

The board of directors of the Mortgage & Acceptance Corp. said that in its opinion it is not possible in view of the present market for securities of finance companies to secure new capital; liquidation of the company with a constantly decreasing volume of business to be handled and the necessity nevertheless for the maintenance of a very complete organization, it is felt will be very expensive; moreover, unless such liquidation is carried on through the courts, there would be a great danger that the company's lines of credit could not be maintained.

U. S. Seeks Maximum Seats in World Road Congress

WASHINGTON, July 1—An appropriation of $8000 is asked from Congress by the Department of State to enable the United States to accept membership in the Permanent Association of International Road Congresses which will hold a meeting at Milan, Italy, in September. The appropriation would cover travel, subsistence and other expenses of participation in the meetings of the organization and of its executive committee.

"The purpose of the association," it is reported by the Budget Bureau, "is to promote and record progress in the improvement of highways and in the efficient development of highway transportation throughout the world. Each government has the right to one representative for each 1000 francs contributed annually to the support of the association, with a maximum of 15 representatives for any one country. It is desired to have the maximum number of representatives for the United States.

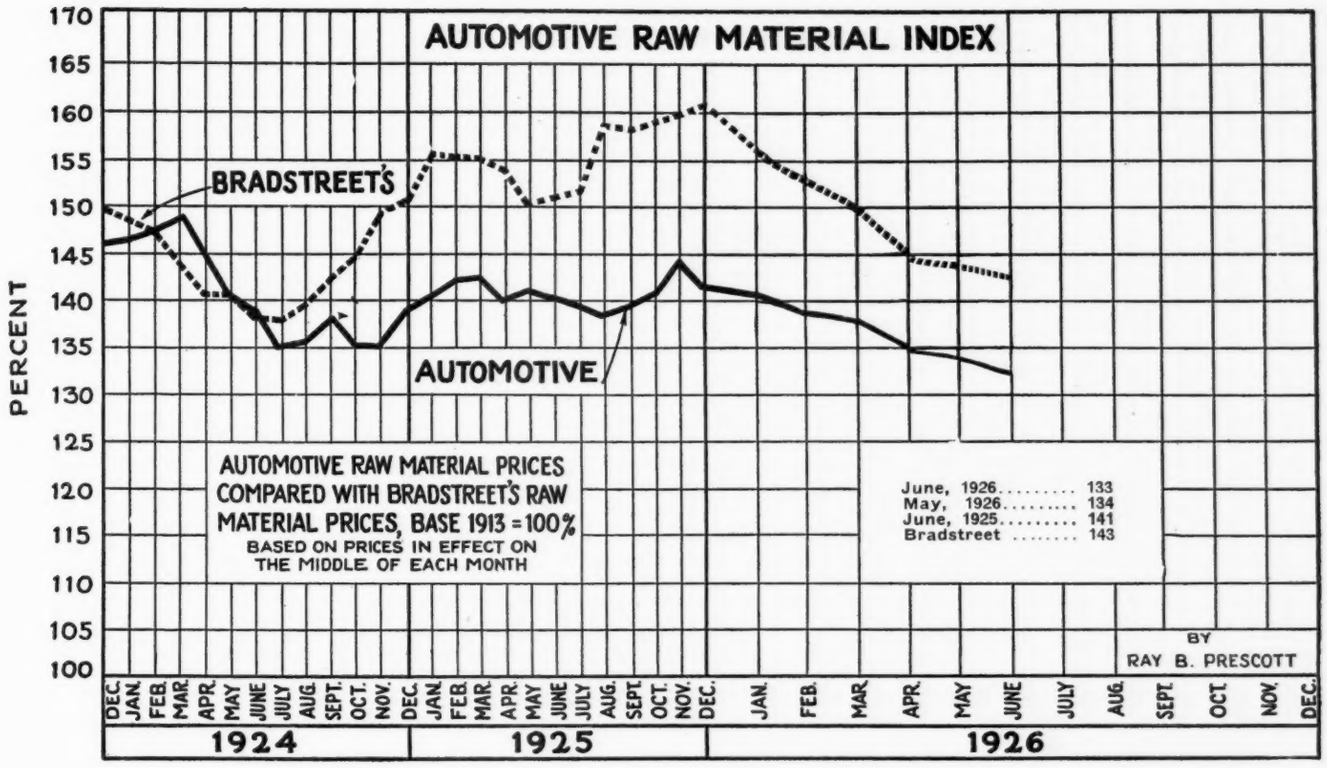
Test New Transmission

CLEVELAND, June 29—Tests of a new transmission for Ford cars made by the Taylor Machine Co. of this city are now being made in a trial trip which will cover about 12,000 miles over all kinds and conditions of roads in every section of the country. The new transmission has been developed by J. P. Johnson, for whom it is named.

The Taylor company is well known in the industry as a manufacturer of gears and transmissions.

Features of the Johnson transmission claimed are simplicity, efficient operation and ease of instalment as a replacement.

June Raw Material Index One Point Lower



Ver Linden Invests $600,000 in Peerless

CLEVELAND, June 28—The faith of Edward Ver Linden, president of Peerless Motor Car Corp., in himself and in the Peerless car has won for him a cool $270,000 in a little over a year. This is in addition to his salary as president of Peerless.

The $270,000 is based on the exercise of an option to purchase 30,000 shares of the Peerless company by Mr. Ver-Linden at $20 per share. This option was given Mr. Ver Linden, Feb. 1, 1925, when he assumed the presidency of Peerless. Today this stock is selling at $29 a share.

Mr. Ver Linden's check for $600,000 was drawn at the directors' meeting this week. It was thought that a dividend might be declared but no action was taken along that line. A statement issued after the meeting, disclosed $2,500,000 net cash on hand with all current bills paid. The company has no bank loans or borrowed money, no bonded indebtedness and no preferred stock. Its capital securities after this purchase of stock will total 258,589 shares of common stock of $50 par value. The profits for the first six months of this year will total $1,000,000, says Mr. Ver Linden.

Start Buffalo Bus Line

BUFFALO, June 26—The International Bus Corp. will start ten-minute bus service on Delaware avenue from the Buffalo city line through Kenmore to Tonawanda and also on Military road from Buffalo to Tonawanda, officials of the company have announced. The service will start about July 1, without waiting for a certificate from the public service commission.

Adjustable Front Seat Chrysler Phaeton Feature

DETROIT, July 1—The Chrysler Corp. announces the adoption of an adjustable front seat as a standard equipment feature on all Chrysler "70" and Imperial "80" phaetons. The front seat frame mounted on rollers is entirely free of the sides of the car and locks in position by means of pins in a metal plate at each side immediately beneath the seat frame. The pin locks are actuated by a single trigger near the driver's heel and it is possible to move the front seat a distance of 5 in. The back of the seat is hinged and can be adjusted to any angle from vertical to horizontal.

Urges Large Down Payments

SPOKANE, June 26—The necessity of improved merchandising methods to insure fair return for dealers was emphasized by L. W. Harkins, president, in his report to the fifteenth annual convention of the Washington Automotive Trade Association. He recommended that in time-sales, the initial payment be large enough to protect the dealer's equity and that the balance be paid in one year. He also suggested better shop management to permit flat-rate prices in view of the increasing number of cars. and the possibility of performing service operations on a production basis.

Packard Nine Months Show $13,529,640 Net

DETROIT, June 25—Net earnings of the Packard Motor Car Co., after all charges and Federal charges, for the nine months ended May 31, 1926, were $13,529,640, compared with $6,254,129, for the first nine months of the preceding fiscal year, a gain of $7,275,510.

The May 31, 1926, balance sheet shows current assets of $32,873,273, and current liabilities of $6,878,615. Current liabilities include $1,307,313, for the cash dividend declared and payable in July.

Cash and marketable securities on May 31, 1926, were $18,363,492. Undivided surplus was $21,220,460, after all deductions for stock and cash dividends declared this year.

Lincoln Drops Unit Service

DETROIT, June 30—The Lincoln Motor Co. in its service bulletin announces that units and parts of units supplied by Delco, Stromberg, Stewart-Warner, Kellogg, Waltham and Exide will no longer be carried in stock by branches, and necessary stocks of these parts are to be ordered direct from the service representatives of these manufacturers.

Ford Sells Windshield Wings

DETROIT, June 28—Ford Motor Co. has added windshield wings to its line of accessories which it is selling through its dealer organization. The wings are specially designed for the Ford open models. A price of $6.50 includes all necessary fittings for attachment.

Standards Bureau to Test New Fuel

WASHINGTON, June 28—Today the Bureau of Standards was given samples of a new fuel developed by the Petroleum Conversion Corp. with the request that it make a thorough test of the data and material filed. Also the aid of the bureau is being sought in determining a name for the new substance which is not a gasoline, it being made up of benzol and napthenes.

Development of this new fuel, which the sponsors claim will increase fuel mileage, eliminate knocking and help conserve the country's petroleum resources, is based upon the discovery of a method whereby the aromatic compounds such as benzine and toluene can be made as a main product instead of a by-product and on a commercial scale.

The fuel itself and the methods for producing it have been tested in laboratories in New York and at a plant in Texas so that in submitting samples to the government bureau the sponsors hope to have their own findings confirmed as well as to learn the exact nature of certain components which may have a wide use outside the petroleum industry.

Ford Russian Tractor Run Will Cover 2000 Miles

WASHINGTON, June 30 — What promises to be the largest automotive and tractor demonstration ever staged in any foreign country, is being planned by the Ford Motor Co. in Russia, according to advices received by the Implement Division, U. S. Department of Commerce, from the American Consul at Moscow. The plan provides for a tractor run of 2000 miles, with demonstrations in every village.

The demonstration is to begin at Tiflis, Soviet Georgia, immediately, routed through northern Caucasus, Kharkow, Staliagrad and to Nizhni-Novgorod. A full line of Ford cars will accompany the tractor demonstrations.

DOWNTOWN GARAGES TO OPEN IN TOLEDO

TOLEDO, June 28—Large garage development in Toledo is planned with announcement of two downtown garages.

The Yellow Cab Co., associating with it the Toledo Transfer Co. and the Yellow Drive-it-Yourself Co., has purchased through 99-year lease 100 ft. frontage on Ontario street adjoining its present headquarters as a site for the new five story garage with facilities for taking care of 1000 motor cars. The location between Madison avenue and Jefferson street is in the heart of the downtown district.

The R. J. Noble Co. has been incorporated to operate a general garage and repair business in the downtown St. Clair street location of the former Simmons Boot & Shoe Co. The five story building will be remodeled and equipped with high-speed elevators.

Payment on Pound Basis Suggested for Air Mail

WASHINGTON, July 1—Revised regulations covering contracts for carrying the mails by aircraft in accordance with an act approved by Congress on June 3, which made the rates on a pound basis instead of a percentage of revenue basis, have been promulgated here.

The fixed rates per pound, accorded to the amended regulations, "shall not exceed $3 per pound for air mail for the first 1000 miles and not to exceed 30 cents per pound additional for each additional 100 miles or fractional part thereof for routes in excess of 1000 miles in length, and not exceeding 60 cents per pound for first-class mail other than air mail for the first 1000 miles, and not to exceed 6 cents per pound additional for each additional 100 miles or fractional part thereof for routes in excess of 1000 miles in length."

Chevrolet May Mark 21,620 Over May, 1925

DETROIT, June 25—Chevrolet Motor Co. produced 74,617 automobiles in May, breaking all its previous records. This was 21,620 greater than in May, 1925, when 52,997 cars were built. Production for 1926, it is expected, will aggregate about 700,000 units, compared with 519,060 cars, last year. Production for the first five months of 1926 totaled 307,332 cars, an increase of 112,444 over the same period of last year.

Monthly production records for the first five months of 1926 and 1925 follows:

	1926	1925
Jan.	45,088	18,292
Feb.	51,303	28,081
March	65,167	43,495
April	71,157	52,023
May	74,617	52,997
Total	307,332	194,888

Australians Seek Bounty for Manufacturing Company

WASHINGTON, July 1—The Automotive Division of the Department of Commerce is informed through a cable received from Trade Commissioner E. G. Babbitt at Sydney that an Australian automobile manufacturing company, to be known as the National Motorcar Co., Ltd., is under process of formation with a capitalization of $2,500,000. Success of the project, however, the cable states, waits upon government support by bounty. It is indicated that the interests involved are those of local automotive concerns, all of Syndey and most of them of British subsidiaries.

Apco Sells Radio Direct

PROVIDENCE, June 24—Effective as of June 1, 1926, the Apco Mfg. Co. has changed its policy on radio merchandising. In the future, Apco radio products will be sold direct to retailers instead of through jobbers. The change does not apply to the Apco automotive lines.

Developments of the Week in Leading Motor Stocks

NEW YORK, July 1—Motor stocks as a group again failed to work out of the rut in which they have been backing and filling for several weeks past, but several issues developed pronounced activity at slightly higher prices.

General Motors practically took the center of the stage in speculative activity and continued to impress the financial community with its underlying strength. Predictions of fancy prices for this issue are now being frequently passed out with confidence in brokerage offices. The company's business gains are proving as remarable as its tape performance and estimates in banking circles indicate earnings in the first six months of better than $17 a share compared with $21 in the entire 1925 year and exceeding any other full year with that one exception in the corporation's history.

Packard, Hupp, Willys-Overland and Nash also were strong features during the past week, while Hudson in response to an unsatisfactory earnings statement on the second quarter's operations advanced a point or more. There has been good buying in several of the motor preferred stocks which offer attractive yields at present prices and are finding favor with buyers too timid to take the risks involved in the purchase of common stocks. Dodge Brothers is being steadily absorbed on this account and Overland, Chrysler, Pierce-Arrow and Yellow Truck preferred issues are also readily taken at current levels.

A bear pool showed its hand in the rubber group last week, bringing about sizable reactions in U. S. Rubber and Goodrich. The move was based on the prospect of an early cut in tire prices as well as the expectation that forthcoming earnings' statements of several of the larger companies will not make a favorable showing.

Accessory issues were in fair demand with Stewart-Warner leading in point of activity and strength. Reports that business was showing some decline due to inventory taking period in several motor plants had little effect on the market as the industry is expecting an early increase in business as automobile manufacturers begin to specify against third quarter requirements.—E. S.

Financial Notes

Martin-Parry Corp. reports for quarter ended May 31, net profit $225,993 after Federal taxes, etc., equivalent to $1.80 a share earned on 125,000 shares of no par stock, as compared with $50,416 or 40 cents a share in preceding quarter, and $118,997 or 95 cents a share in quarter ended November 30, 1925. Net profit for first nine months of fiscal year totaled $395,406, equal to $3.15 a share, comparing with $200,575, or $1.60 a share in same period of previous year.

Hewitt Rubber Co. has announced an issue of 20,000 shares of 7 per cent cumulative prior preference stock with a bonus of common stock. This financing is to be handled from their own offices and through their own organization without underwriting. Proceeds from the sale of this issue will be used to supply additional equipment, take care of increased sales and furnish adequate working capital for the company's expanding business.

Willys-Overland Co. will retire $745,512 of outstanding preferred stock by July 1. Terms of retirement provide that 3 per cent of the maximum amount outstanding shall be retired by July 1 each year. Bonded indebtedness has been reduced to $7,000,000. This was accomplished last December by the complete payment of the 1926 requirements which usually are due by July 15 each year. The company has no bank loans.

Federal Motor Truck Co. stockholders have approved a plan to increase capitalization from 200,000 shares of $10 par value common to 500,000 shares of no par value and to pay a stock dividend of 100 per cent which will require 400,000 shares of the new issue. The balance of 100,000 shares will be used for stock dividends, payable quarterly, of about 2½ per cent.

Moon Motor Car Co.—When the directors meet, July 1, no change will be made in the dividend policy. Stanley Moon, secretary, says that the company is now producing a new model to sell for $995 and that deliveries will begin early in July. He adds that future orders on this new model would call for heavy third-quarter production.

Eaton Axle & Spring Co. has declared a regular quarterly dividend of 50 cents payable Aug. 1 to stock of record July 15. J. O. Eaton, chairman of the board, says that May earnings are the largest in the company's history.

Sterling Motor Truck Co. has declared its thirty-second consecutive quarterly dividend of 2 per cent on preferred stock, payable July 1. A 5 per cent dividend also has been declared on the common stock.

Auburn Motor Car Co.—Effective June 24, the Detroit Stock Exchange listed 67,527 common shares of this company.

Federal-Aid Road System to be Built in Australia

WASHINGTON, July 1—The need of a coordinated highway system has been nationally recognized by Australia, which has announced a Federal-Aid program modeled, in part, after that of the United States, according to a report to the Department of Commerce from Consul W. T. Costello at Melbourne.

Tentative plans call for a construction program for ten years and a sum of £20,000,000 to be expended in two periods of five years each. Allocation of Federal-Aid to the states is to be on a basis of three-fifths population and two-fifths area. The states are to furnish 15 shillings for every pound sterling of Commonwealth expenditure. With the advent of a national Federal-Aid program considerable impetus to business is looked for by automobile importers as a direct result.

Drake Asks $550,000 to Launch Aviation

WASHINGTON, June 30—The appropriation of $550,000 as the first step in the realization of the nation's commercial aviation program, provided for in the recently passed Parker-Bingham bill, was recommended this week before the House Appropriations Committee by J. Walter Drake, Assistant Secretary of Commerce.

Appropriation of the money, Mr. Drake told the committee, will mark the actual launching of the country's aviation program and will mean much to the automobile and transportation industries. Under the Parker-Bingham bill all of the government's major aviation activities are to be placed under an assistant secretary of commerce, in charge of aviation, who will concern himself with the establishment of air lanes, landing fields, night lights, hangers, etc., enabling commercial aviation concerns to have available a network of fields and service stations throughout the United States.

The Army and Navy air forces will, of course, continue to be operated as separate units, turning over to the aviation secretary of the Commerce Department, however, all details as to routes, fields, etc. Postal air ways and their personnel numbering some 150 will be transferred to the Department of Commerce on July 1.

DuPont Motors to Expand

WILMINGTON, June 30—DuPont Motors, Inc., which a year ago moved its plant from Moore, Pa., to Wilmington, has mapped out an expansion program. According to E. Paul duPont, president of the company, duPont Motors has made considerable progress since coming to this city, a full line having been developed, including open cars, coupes and sedans. W. A. Patton has been placed in charge of sales and distribution.

Turner in New Plant

KOKOMO, July 1—Turner Mfg. Co. has moved into its new factory buildings here which will give it 16,000 ft. of manufacturing space. The company manufactures timers, foot accelerators, oil gages, fan belts and other items of equipment. The new building has been made necessary by steadily expanding business since the formation of the company six years ago, and much larger expansion is now planned in keeping with the new manufacturing facilities.

Dunlop Rounds Out Balloon Tire Line

Adds Five New Sizes Which Will be Marketed Under Trade Name "Buffalo"

BUFFALO, June 30—The Dunlop Tire & Rubber Co. now has available to the trade, a new popular priced line of balloon tires known as the Buffalo, according to an announcement just received from officials of the company. The Buffalo balloon comes in the following sizes: 29 x 4.40; 29 x 4.75; 30 x 4.95; 30 x 5.25; 30 x 5.77, and 31 x 5.25. In the new output, a Buffalo balloon tube is included.

The Dunlop company has produced a 29 x 4.40 Buffalo balloon tire for some time, and it was the encouraging response from the trade, because of the performance of this tire, that the company was led to produce the other five sizes.

The tread of the new tire, manufactured at the Buffalo plant of the Dunlop company, is of the flat, double-mileage strip type, with heavy inverted "U" blocks, which are said to possess a high degree of non-skid qualities.

Pennsylvania Rail Lines Seek Bus Operating Rights

HARRISBURG, PA., June 30—The Reading Transportation Co., a subsidiary of the railroad, if given a charter by the public service commission, will operate its motor buses on the same schedule that trains are now being operated, it was testified yesterday at the hearing before the commission.

Appealing for the approval of the commission was E. D. Osterhout, general passenger agent of the Reading company, who explained the proposed operation of the buses. It was said that permit for a merger of the subsidiary company with the railroad will eventually be applied for.

The Williams Valley Transportation Co. made its first application for permission to operate motor vehicles as common carriers in the upper end of Dauphin county.

The Schuylkill Transportation Co., a subsidiary of a trolley system operating in Schuylkill, Columbia, Northumberland and Luzerne counties, submitted its application. It seeks to establish bus routes for the transportation of persons in local groups or party service from Ashland, Girardville, Mahanoy City, Tamaqua and Pottsville, in Schuylkill county, to various points in the other three counties.

P. R. R. to Form Bus Company

HARRISBURG, PA., June 30—The Pennsylvania railroad proposes to present individual applications in the future for various bus lines, as it is considered advisable to inaugurate each, in the event a charter is granted its proposed bus company to be known as the Pennsylvania General Transit Co. It is planned to operate buses in 55 counties.

Business Drop Mild, Battery Makers Told

Recession Similar to Past Three Years—General and Technical Problems Discussed

NEW YORK, June 26—About 35 members of the National Battery Manufacturers' Association in annual convention at Hotel Roosevelt here heard Prof. J. L. Snider express the view of the Harvard Bureau of Economic Research and Business Forecasting that general business and industry in the United States is not sliding into a serious depression but rather into a fairly moderate recession, in most lines, similar to those of 1923, 1924 and 1925, but not so pronounced as that of 1924.

For this view there were two reasons: Large credit resources at low rates, a condition which has never presaged serious depression; and the prevailing conservative attitude of business men generally.

L. A. Nixon, secretary of the National Radio Trade Association, urged the companies represented to counteract public prejudice against storage batteries by a campaign of education along positive lines. Storage battery advertising, he thought, was too technical and perhaps too competitive, whereas it should educate the public in the proper use and care of such batteries and their advantages from the standpoint of efficiency.

The Nixon talk developed considerable discussion as to the efficiency and future of B batteries and what Mr. Nixon called a "word-of-mouth" campaign against trickle chargers, instilling public fear of them which he believed battery manufacturers should offset.

C. H. Smith of the Westinghouse Union Battery Co., urged avoidance of production waste by simplification of products, proper economy and a cost accounting system suitable to the needs of each concern. A paper on uniform accounting, written by Mr. Smith as chairman of the cost committee, was distributed.

Dealer Education Necessary

A. F. Strayer, U. S. Light & Heat Corp., in his constructive paper on credit problems in the battery industry, stressed the one essential of educating the dealer to higher business standards and better accounting methods. The credit manager should be one of the strongest aids to the sales department if, in dealing with over-due accounts, he aids the dealer by not only analyzing his balance sheet but giving other constructive and fundamental thoughts on business.

Mr. Strayer's experience has shown that by such a policy he has not only held dealers but aided them in increasing their business.

J. B. Perlman, Hartford Battery Co., on the subject of the dealer problem, emphasized the necessity of holding dealers by a satisfactory company policy. The Hartford Battery Co., in pursuance of this aim, instituted a cooperative profit-sharing plan with its dealers. Certificates based on sales volume are issued to dealers each month. These certificates have a value of approximately 25 cents per battery sold. The plan has not been in operation long enough to indicate how valuable it may be.

Technical Papers Read

H. B. Taylor, Eagle-Picher Lead Co., described the technique and formulae of battery grids and oxide mud; W. C. Brooks, Hartford Battery Mfg. Co., discussed trickle charger and combination A battery units; C. F. Garesche, National Lead Co., emphasized the importance of conserving health in the battery plant; D. H. Kelly, U. S. Light & Heat Corp., made his report as president of the association, and after considerable discussion, in which Mr. Luthy participated, the plan to make an official test of the Luthy process of storage battery manufacture was laid on the table.

Mr. Kelly was reelected president, R. D. Mowry, Universal Battery Co., and P. Marko, Marko Storage Battery Co., were again chosen first vice-president and treasurer, respectively, and these new officers were elected: Second vice-president, O. L. Shutz, Grant Storage Battery Co.; secretary, T. D. White, Victor Storage Battery Co. The board of directors includes these officers and C. H. Smith and L. A. Doughty, Carlile & Doughty, Inc.

Cooper-Hewitt Expands Manufacturing Facilities

HOBOKEN, N. J., June 28—Cooper-Hewitt Electric Co. has drawn plans for a new building adjoining its present factory which will be 100 ft. by 430 ft. and be six stories in height. The first part of the building will be 100 ft. by 200 ft. and will be started at once. It will contain the glassware manufacturing and shipping departments and the general offices of the company and the sales department. The laboratories of the company also will be brought together in the new building.

The new building is made necessary by the increased business of the company in its many fields which include industrial illumination, photographic and motion picture lighting, various applications of quartz apparatus as a source of ultra-violet light, and the manufacture of Kon-nec-tors or mercury switches.

Open New Pitcairn Field

PHILADELPHIA, June 28—The new Pitcairn aviation field, constructed at a cost of $500,000 by H. F. Pitcairn, near here, was dedicated this week. The new field replaces one of the same name developed several years ago which was the scene of many notable aviation events. With the opening of the new field all activities at the old field are discontinued except operation of the Pitcairn machine shops on airplane manufacturing work. All flying events and student instruction will be transferred to the new field.

N. Y. Tire Dealers Ask Price Guarantee

Association Names Committee to Confer With Manufacturers—Uncertainty Harmful

NEW YORK, June 28—The Greater New York Tire Dealers' Association, at a meeting in Hotel Pennsylvania, Friday, took definite steps towards ascertaining, if possible, from tire manufacturers whether any arrangement can be worked out by which the manufacturer will guarantee future tire prices to the dealer for a reasonable period ahead.

The association appointed a committee consisting of George J. Burger, president; L. A. Brown, secretary; Joseph Groth, William Jude and Louis K. Beller to confer with the manufacturers in an effort to secure such co-operation which the dealers believe they must have to continue in business. Mr. Burger said the dealer does not demand higher or lower prices but merely wants to know where he stands with reference to future prices.

"The dealer has been the catspaw in this matter for too long," said Mr. Burger, "and it is time that he wake up to this fact. Manufacturers ought to know what their production costs are and what tire prices should or will be. Manufacturers should co-operate with the dealer in this respect because uncertainty as to future prices retards purchases by the dealer."

Recently the association sent out a letter to leading tire manufacturers asking what dealers might expect in the way of prices after July 1. Mr. Burger describes the replies as evading the questions and as indicating that each manufacturer is determined to stand pat on present methods if the others do.

Congressman Advises Action

Mr. Burger agreed with the advice given to dealers by Congressman Loring M. Black, Jr., that under present conditions they were justified in pursuing a hand-to-mouth buying policy. Most dealers believe that tire prices ought to drop, but apparently manufacturers see no reason why they should. Congressman Black believed the dealers should insist on a reduction, especially since—as shown by their costs and profits and what the crude rubber situation has revealed—"the manufacturers have not suffered during the period of restricted rubber."

"Before the advance," Congressman Black said, "the cost of crude rubber in a 32 x 4 cord tire to the manufacturer was $1.65 but after the advance the increased cost to the manufacturer was $2.95, to the dealer $9 and to the public $12.15." He insisted there was nothing to justify such a disparity in the scale of increases. When Congressman Black quoted statements of authorities that dealer gross profits were 30 to 35 per cent there was laughter from the 100 men present.

Automotive Steels Hold Steady Output

Full Finished Sheets at Four-Fifths Capacity—Prices Maintain Firmness

NEW YORK, July 1—For the time being, steel producers are devoting all of their energy to the maintenance of the market at prevailing price levels. Buying of full-finished automobile sheets has broadened somewhat, and the market may be characterized as firm at 4.20 cents, Pittsburgh. Undoubtedly, however, the chief influence on sheet prices has been the tenacity with which sheet bar mills cling to the $36 quotation for third-quarter contracts.

The general impression is that the sheet market has struck bottom and that during the seasonally dull period in the steel industry it should be relatively easy to maintain prevailing prices because there will be less incentive to cut prices when concessions would hardly serve to bring out very much additional business. Judging from the rate of operations, the leading interest is somewhat better situated in point of orders on hand than are the smaller independents.

Hot-rolled strip steel is pointed to as one of the most active items on the list. As concerns bars, shapes, and plates, specifications against old contracts, placed before the leading interest announced a quasi-advance of $2 a ton, are running far heavier than new business. In fact, the new price does not appear so far to have stood the acid test of representative sales.

On the whole, steel company sales managers are pleasantly disappointed by the rate of sales during the last half of June. They had prepared themselves for a considerably greater decline in buying than has actually taken place. A few weeks ago, when automotive demand dipped, the steel industry apprehended a gradual tapering-off, aggravated by the slackening pace of midsummer activities generally. The last week has shown that their fears were not justified.

Full-finished automobile sheet makers are now operating at about four-fifths of capacity where, a few weeks ago, they had but three-fifths in operation. The steel industry now hopes that automotive demand will go far toward making up for the natural midsummer slump to be expected in other consuming lines.

Pig Iron—Buying by automotive foundries is moderate. Recent heavy sales of pig iron were confined to one large radiator interest, and some of the blast furnaces that depend for the sale of their output upon demand from the general run of foundries are likely to go out of blast in the next few weeks. The market remains easy.

Aluminum—Imports continue apace. In spite of reports from the Continent that production there is being maintained only on a parity with domestic consumption, there appears to be a considerable margin of surplus for export. A recent statement by one of the officials of the sole American producing company that the latter is not interested in the Norwegian production does not preclude that American capital is interested in Norwegian production and that this capital is furnished by investors who are also interested in the American producing company. The market is steady and unchanged.

Copper—The market is far more quiet than the spokesmen for the producers, all of whom predict great things for the market in the future. So far prices remain virtually unchanged.

Tin—Amid daily seesawing, the market seems to be working gradually upward by fractional advances.

Lead—Demand is fair, but storage battery makers appear to be well covered.

New Equipment Cuts Dodge Forging Cost

DETROIT, June 28—Dodge Brothers, Inc., has just completed construction of a new 75 x 400 ft. steel and brick building as an addition to the new forge and heat treatment department. Upsetting machines, heavy steam and board hammers and electric ovens are now being installed as rapidly as they can be provided by the manufacturers.

Three giant hammers rated at 12,000 lb. capacity for making heavy chrome-vanadium steel forgings, such as the crankshaft and front axle center I-beam, are being installed. Compared with the 5000 and 6500 lb. hammers in use before, they will make possible a considerable decrease in the cost of making these heavy forgings. Two of the board hammers are of 4000 lb. capacity and eight of 2000 lb. capacity. Furnaces for heating the steel bars are of the modern continuous type.

The corporation expects to effect a great saving in making certain gears which were formerly forged under the board or steam hammers. Upsetting machines will convert the hot vanadium steel into accurate gear blanks. The process, due to the great pressure, results in a fine-grain, accurate gear blank.

New material used in making valves will be economically and accurately heated in a battery of electric furnaces which are being installed. There is little more metal to remove than the thickness of paper, due to the improved method of forming the head, which requires no finishing other than a light grinding cut on the seat. The importance of the process is emphasized by the cost of the special alloy valve steel, which is 10 to 15 times that of material previously used.

Endorses Metal Propellors

WASHINGTON, June 25—Airplane propellers, made of metal, are much more efficient than wooden propellers at high air speeds, it has been found by the U. S. Bureau of Standards following several months of test and research in this field.

The tips of blades of all propellers, it is pointed out, travel at a rate of speed up as high as 700 miles per hour, and the finer cross-section on the propellers made possible in the use of metal greatly helps their efficiency under these conditions, the bureau finds.

Rubber Trend Lower, Restrictions Loom

London Stocks Show Further Increase—June Consumption Estimate Under Arrivals

NEW YORK, June 28—The past week's rubber market has been featureless, with little business and with most interests maintaining a waiting attitude. On the one side the statistical position indicates a lower price level as against the constant fear of drastic action by the British government if the prices should go lower.

London average spot price from May 1 to June 23, inclusive, was 21.68 pence. To maintain an average of 21 pence for the restriction quarter (May to July), the price from June 23 to Aug. 1 must average 20.04 pence for spot rubber.

London stocks increased last week by 383 tons, bringing the total to 22,664 tons. The estimate for this week is a further increase of 800 tons.

Arrivals at New York for this month are 23,663 tons and the total for June will probably not exceed 27,000 tons. Estimates for arrivals during July are from 37,000 to 40,000 tons. Estimates for consumption during June are about 26,000 tons.

Columbus Tire & Rubber on 400 Daily Schedule

COLUMBUS, June 28—The Columbus Tire & Rubber Co., which has recently completed a refinancing plan, started active operations at its plant this month. Production at this time is 400 tires daily, which will be increased. Within 30 days it is expected that fully 600 to 700 tires will be produced daily. The plant had been idle since last October.

According to John W. Zuber, secretary of the company, the refinancing arrangements have gone through satisfactorily and permanent officers are now announced as follows: A. Simons, president; Veit Koerner, vice-president; John W. Zuber, secretary, and W. H. Herman, treasurer and general manager. Mr. Herman is at the head of the Herman Mfg. Co., of Lancaster, producers of tire making equipment.

New molds and cores are now being installed in the plant in order to increase the output.

Chemists to Discuss Rubber

NEW YORK, June 28—The world's rubber problems will be discussed by experts from many nations at an International symposium on Raw Rubber to be held in connection with the golden jubilee of the American Chemical Society in Philadelphia, Sept. 6 to 11.

John M. Bierer, of Boston, chairman of the society's rubber division, announces that the symposium will deal with knowledge affecting the results of botanical, chemical, technical and engineering research in America and abroad.

Men of the Industry and What They Are Doing

Leduc Named Sales Head of Overland in Canada

Florian Leduc, who has been manager of the Montreal branch of the Willys-Overland Sales Co., Ltd., for the past five years, will assume the position on July 1 of general sales manager for Canada of that company. Mr. Leduc will take up his headquarters in Toronto.

In taking his new position Mr. Leduc succeeds E. R. Paige, who was general sales manager and who has gone back to his old firm, the Simon Sales Co. of Brooklyn, N. Y. Coinciding with this appointment of Mr. Leduc, W. W. Gardhouse has been appointed retail sales manager of the Toronto branch which is the largest retail branch of the company in Canada, though taking in Toronto only. H. L. Rochon has been named to be manager of the Montreal branch, with jurisdiction for all Quebec province. Previously Mr. Rochon was in charge of the Toronto branch. The changes do not involve any difference in the sales policy.

Kettering on Bus Trip

C. F. Kettering, General Motors Corp. vice-president in charge of research, is making a trip through the west in a specially outfitted model Y Yellow coach. The outfit includes a Frigidaire, a radio, an electrical phonograph and a number of special features, including the fact that it can be put back into service without undue cost. The party expects to drive the coach at 50 miles an hour whenever possible. It left June 21 and will be back in Dayton by Aug. 1.

Ellis Honored by Bankers

M. W. Ellis, general manager of the Hart-Parr Co., manufacturers of tractors, and president of the Security Trust & Savings Bank of Charles City, Iowa, has been elected to the executive board of the American Bankers Association at the convention of the Iowa Bankers' Association, held at Sioux City, June 22. This election is in recognition of the fine service Mr. Ellis has given to the Iowa Bankers' Association as group secretary, group chairman, member of the committee on agriculture and other services.

Upham Joins Road Builders

C. M. Upham has resigned as chief highway engineer of North Carolina to become managing director of the American Road Builders' Association, and will also act as a consulting engineer. Mr. Upham will also handle the reorganization of the construction division of the Mexican Federal Highway Commission, having already reorganized the engineering section.

Partridge Named Lee Head

F. E. Partridge has been appointed vice-president and general manager of the Lee Puncture Proof Tire Co. of Canada, Ltd.

OLDEST DISTRIBUTOR ENTERTAINS MORSE

Elliot C. Morse, director of export sales for the Chrysler Corp., is touring Mexico in the interest of the further development of Chrysler business in that country.

While in Mexico City recently he was the guest for a few days of A. B. Mohler, president of Mohler & De Gress, the oldest export distributor connected with the Chrysler organization. He has in turn represented the Thomas Flyer, the Chalmers, the Maxwell and now the Chrysler during a period of more than twenty years.

On leaving Mexico, Mr. Morse will sail for Havana to direct personally the first steps of the Imperial Automobile Co., new Chrysler distributors in that territory.

From Havana he will return to Detroit by way of New York.

Wilson Talks to Wright Men

Commander Eugene E. Wilson, chief of the engine section of the Bureau of Aeronautics, at a banquet of the Mutual Benefit Association of the Wright Aeronautical Corp., gave some interesting sidelights on the performance of modern aircraft engines. Commander Wilson contrasted present Navy plane performance with that of the planes of a few years ago in which flying to Guantanamo alone was an adventure accompanied by quite some risk, two or three changes of engines and more than a little repair work. He stated that the engines now used will stay in the air for a period of 275 hours without overhauling.

Berry to Fly With Fonck

Cap. H. F. Berry, of New York, has been selected as the American pilot to accompany Capt. Rene Fonck on the nonstop New York-to-Paris flight which will be attempted this summer. Captain Berry flew overseas during the war and is now an army reserve aviator. His selection completes the personnel for the flight. Lieut. A. P. Snody, United States Navy, will be navigator.

George A. Bauer

PHILADELPHIA, June 26—In the death of George A. Bauer, vice-president of W. E. Shipley Machinery Co., is removed a personage widely known in the automotive and other industries of the United States. First joining the E. A. Kinsey Co. of Cincinnati, he later joined the Harris Automatic Press Co. of Cleveland, coming from this organization 25 years ago to the W. E. Shipley Company, with whom he continued until his death. Since 1908 he was vice-president of the Shipley company.

Graybar Executives Join in Outing and Contests

The first outing and picnic of the Graybar Electric Co., since its formation on Jan. 21, was held recently at the New York Athletic Club grounds on Travers Island.

Frank A. Ketchan and George A. Cullinan, executive vice-president and vice-president in charge of sales, respectively, won the horse-shoe pitching contest, and the baseball game was won by the sales team captained by George K. Heyer, assistant general supply sales manager.

At the dinner, the toastmaster was Herbert Metz, advertising manager.

W. G. Gilmer, Jr., Resigns

Walker G. Gilmer, Jr., who has been associated with L. H. Gilmer Co. for 20 years, has resigned his connection as chief of engineering though remaining as a director of the company. While with L. H. Gilmer Co., Mr. Gilmer, a mechanical engineer, member of A. S. M. E. and member of the Society of Automotive Engineers, served actively in various capacities as factory manager, sales manager and chief of engineering, at all times being closely identified with the management. Mr. Gilmer contemplates locating in Detroit, where he will do consulting and sales engineering and development work.

C. A. Campbell Visits Southwest

C. Alfred Campbell, sales development manager of the Stutz Motor Car Co. of America, Inc., has returned to the factory from a visit to Texas distributors and at other southwestern points. Mr. Campbell reports a healthy business condition. Passenger cars are selling and showing a distinct gain over last year. An increasingly large number of sales being to persons changing to higher priced lines and involving trade-ins.

Sherin Moves to Detroit

G. W. Sherin, sales manager of the polish section of E. I. du Pont de Nemours & Co., has moved his department from Philadelphia to the General Motors building, Detroit, where he will be in close touch with the Duco division of the company and with the automotive trade generally. Mr. Sherin's division markets Duco polish and other automotive chemicals.

Netherlands Dealer Here

E. F. Breitenstein, representing the Van Der Mark Co., and Automobil Toebehooren Import Co., of Amsterdam, Holland, has arrived here and will spend some time in this country looking for new lines for his concern to handle and studying the American automotive industry.

Trade Firm as Industry Enters Last Half

(Continued from page 4)

make no analysis for the decline. It may be due to the idea that many new cars are to be announced next month. General business is not as good as merchants would like to see it.

Compared to sales a year ago the average for June this year will be found about no par. It was expected to be better based upon the great falling off in January and February. The distributors expect July to bring better sales with a period of settled weather. People in Boston today are wearing their vests and some of them the suits they wore through the winter. Merchants look for a general increase from now on.

On the other hand the truck merchants have been doing a very good business.

CHARLOTTE

A SEASONAL slight downward trend in the demand for all lines of automotive products characterized the market in the Carolinas in June, but the half-year was ended with fairly favorable conditions obtaining, with competition increasing in vigor.

Retail dealers in tires and representatives of branches here of large manufacturers of tires reported that the demand for these lines is steadily but slowly decreasing. Strenuous efforts are necessary to meet the competition in this trade.

The accessories and replacement parts jobbers indicated that this trade is featureless, subject to the seasonal slackenging in demand and perhaps somewhat under or about equal to the volume for this time last year.

KANSAS CITY

THE volume of motor vehicle sales has been lower in June than in May but a little ahead of June, 1925. The reports, however, vary radically. It seems certain that volume in the lower value passenger cars has fallen both for the month and for the year; and some of the higher grade cars have sold in substantially larger numbers. While in general the trade was below May, both in the city and in the territory, May having been an exceptionally good month; yet some lines show good gains over May.

Another factor in the trade, is reflected in this situation: The inclination of low-priced car dealers to secure agencies for higher grade cars. Unrest is observable among the dealers, through this condition.

Accessories have sold in considerably larger quantities through recent weeks. One factor in this result is said to be the good movement of used cars, particularly the used cars of higher value as against the purchase of new cars of lower price level. One dealer reported the sale of 20 used cars at prices between $1000 and $1500 in June.

The prospects are considered good for substantial business in July, and the rest of the summer and fall.

SAN FRANCISCO

PASSENGER car sales took a turn for the better during June with sales running about 20 per cent better than those of May and nearly 30 per cent better than those of June a year ago. Improvement is caused partly by first payments on the large fruit crop which sold at high prices and partly by reductions in car prices on lower-cost cars.

General business conditions in central northern California, southern Oregon and Nevada excellent. Used cars rebuilt and selling for $750 upwards are going strong but cheaper cars sold "as is" are not moving. New trucks selling about 30 per cent better than in May and 25 per cent better than June year ago. Increase in use of trucks due to cutting up of several large California ranches into small farms, and to growth of long distance hauling by warehouse and drayage companies. Ford price cut, though late in the month, had material effect in increasing sales.

CHICAGO

PASSENGER car sales volume in June is estimated at about 25 per cent greater than the same month last year and about even with May this year. General business conditions are good with feeling better than approximately two months ago. The labor situation has adjusted itself in the building trades, the only division that has caused any trouble this year. Used car business still from so called "shoppers" who buy automobiles from the dealers who offer the best terms for the old car.

Truck dealers find no fault with the market, declaring business is showing better than a normal seasonal increase.

Time payments appear in good shape taking the reduction in offers of repossessed cars as a barometer.

SALT LAKE CITY

NEW car sales are ahead of a year ago, but not as good as in May. For the month ending June 26, 1483 cars were sold. In May the figures were 1857. Used car situation is better, but still unsatisfactory. Many dealers are taking big chances in order to increase their new car business. Used car stocks are concentrated in fewer hands than usual. The outlook for business is generally regarded as very good. There is more confidence in the trade than usual at this season. Weather has set in hot for the first time this summer, this helping business as it is making a demand for cars with which to escape the excessive heat. General business conditions are good.

NEW ORLEANS

A SURVEY of automobile sales in the city of New Orleans for June indicates a drop of slightly over 7 per cent on all types of cars as compared with sales in May, but shows an increase of between 11 and 12 per cent over the same month of last year.

The used car department has suffered a slight depression, but practically all dealers report used cars in better shape now than at the same time last year, due to conservatism on trade-in allowances.

The automobile accessory business of this city has suffered a slight depression from last month, but on the whole the accessory sales have held up better than automobile sales.

Tire dealers declare that there is only a slight fluctuation in the business of June over May, and that there is an increase of approximately 10 per cent over June 1925.

PITTSBURGH

A SLIGHT slowing down in automobile sales during June in the Pittsburgh and western Pennsylvania district is laid to the consumers' desire to wait for new models.

Sales of new machines in this district showed a decline when compared with May, but the average was not more than a few per cent. Compared with June of the previous year, sales were just as good, if not slightly better, according to dealer statements. As was evident in May, low-priced cars in June made a better showing, the middle class held about even and the high-priced cars dropped off slightly.

Tire and accessory business was slow to fair during the month. The used car situation was declared to be unchanged. Liquidation of used cars has been good.

The truck situation was declared to be "ordinary." There was nothing exceptional in the trade, it was implied. Light truck sales were not as good as during the earlier spring months and the heavy truck sales in this district are not expected to be good until August, when buying for coial deliveries begins.

PHILADELPHIA

ALTHOUGH reports are not complete there is every reason to belive that June sales of cars and trucks in Philadelphia topped the totals of April and May of this year and June of last year. Distributors and dealers reported good business in new cars. None carried a very large stock of new cars.

Used car stocks mounted during the month, business being very slow and involving only closed cars in an overwhelming majority of cases.

Exports, Imports and Reimports of the Automotive Industry for May of current year and total for eleven months ending May, 1926

	Month of May				Eleven Months Ending May			
	1925		1926		1925		1926	
	Number	Value	Number	Value	Number	Value	Number	Value
EXPORTS								
Automobiles, parts and accessories (total)	..	$33,416,083	..	$29,658,460	..	$230,483,278	..	$309,547,570
Electric trucks and passenger cars	18	26,377	8	20,202	125	183,333	86	140,952
Motor trucks and buses, except electric:								
Up to 1 ton	4,270	1,852,786	4,686	2,060,729	25,160	10,564,560	52,755	23,013,383
Over 1 and up to 2½ tons	886	1,186,874	1,513	1,150,650	6,416	8,398,347	11,779	14,160,775
Over 2½ tons	153	432,665	163	518,960	1,404	3,862,858	1,888	5,901,142
Total motor trucks and buses, except electric	5,309	3,472,325	6,362	3,730,339	32,980	22,826,291	66,422	43,075,300
PASSENGER CARS								
Passenger cars, except electric:								
Value up to $500, inclusive	8,542	2,916,084	6,458	2,641,427	66,226	24,065,145	102,435	38,653 512
Value over $500 up to $800	6,624	4,648,831	8,241	5,515,032	44,201	31,283,448	60,013	41,877,542
Value over $800 up to $2000	..	..	..	..	22,761	26,749,809	..	..
Value over $800 up to $1200	6,188	6,491,078	5,721	5,986,220	25,345	26,525,565	57,151	60,348,584
Value over $1200 up to $2000	2,735	4,051,347	1,128	1,706,683	9,487	14,061,658	12,678	19,159,804
Value over $2000	473	1,300,942	572	1,574,464	3,924	10,892,272	4.931	13,515,877
Total passenger cars, except electric	24,562	19,408,282	22,120	17,423,826	171,944	133,577,897	237,208	173,555,319
PARTS, ETC.								
Parts, except engines and tires:								
Automobile unit assemblies	..	5,271,780	..	3,936,016	..	35,036,478	..	42,638,571
Automobile parts for replacement	..	2,564,346	..	2,267,654	..	22,004,777	..	28,632,338
Automobile accessories	..	851,316	..	858,059	..	6,527,175	..	8,718,735
Automobile service appliances (n.e.s.)	..	393,174	..	623,390	..	3,470,969	..	6,077,438
Station and warehouse motor trucks	43	42,207	11	18,005	240	157,052	124	115,053
Trailers	15	5.582	58	31,118	598	217,440	905	356,563
Airplanes	16	29,375	40	8,993	64	326,156	73	335,118
Parts of airplanes, except engines and tires	..	6,374	..	19,316	..	118,290	..	105,779
BICYCLES, ETC.								
Bicycles and tricycles	621	17,638	722	20,617	7,237	180,935	6,205	176,121
Motorcycles	1,899	430,394	2,061	442,313	17,801	4,047,769	22,343	4,839,514
Parts, except tires	..	137,499	..	135,062	..	1,392,214	..	1,582,262
INTERNAL COMBUSTION ENGINES								
Stationary and portable:								
Diesel and Semi-Diesel	35	64,771	64	79,450	767	449,222	1,387	1,205,757
Other stationary and portable:								
Not over 10 H.P.	2,149	186,287	2,847	242,977	26,090	2,440,896	28,281	2,446,405
Over 10 H.P.	213	197,576	116	101,145	1,949	1,748,474	2,375	2,022,368
Automobile engines for:								
Motor trucks and buses	3,261	299,938	43	22.576	27,032	2,401,215	14,197	1,335,779
Passenger cars	13,524	1,521,719	13,517	1,399,788	67.053	7,926,112	113,223	11,450,576
Tractors	120	45,716	251	138.049	2,260	744,521	1,791	854,102
Aircraft	3	8,320	82	192,856	56	109,920	273	445,769
Accessories	..	405,969	..	458,377	..	3,202,943	..	3,892,558
IMPORTS								
Automobiles and chassis (dutiable)	64	94,433	50	102.678	502	840,806	688	1,046,549
Other vehicles and parts for them (dutiable)	..	77,539	..	6,755	..	664,166	..	489,153
REIMPORTS								
Automobiles (free from duty)	11	6.361	12	18,244	455	664,505	156	231,625

Export Totals Show Half-Million Drop

WASHINGTON, July 1—A slight decline is noted in the total value of United States and Canadian automotive exports including parts, motor cycles, motor boats, aircraft and kindred products, but exclusive of tires, during May as compared with April, according to revised figures just made public here by the Automotive Division of the Department of Commerce which show that the May exports totalled $34,118,315 as compared with $34,652,258 in April.

The revised figures reveal that although the number of passenger cars exported from the United States decreased from 23,152 in April to 22,120 in May the value of these exports amounting to $17,423,826 represented a gain of $214,577. On the other hand, United States truck exports decreased from 8037 valued at $5,315,063 to 6362 valued at $3,730,399 during the same period.

Scrutiny of the revised statistics show that the combined United States and Canadian unit exports decreased 3.4 per cent and at a greater rate than the combined production which declined 2.1 per cent. The average unit value of United States passenger car exports gained $45 over the $743 average unit value figure for April.

United States passenger cars bound for Australia decreased from 3607 to 2947 during May, while the exports to Canada which amounted to 5258 units represented an increase of 2670 over shipments during the preceding month.

Cuba and Mexico were the only two of the four principal Latin American markets whose positions as sales areas for passenger cars and trucks were not either enhanced or maintained.

Moon Motor Company Adds 14 Foreign Distributors

ST. LOUIS, June 28—Fourteen new export distributors have been added by Moon Motor Car Co. in its foreign territory expansion program of the past three months. With the new group the company has 57 distributors in the foreign field, covering 31 countries. The latest additions to the export group are Savoy Garage, Vienna; Sinna Legbe & Co., Colombo, Ceylon; Shangai Motor Sales Corp., Shangai; B. Bueno & Hijos, Bucaramanga, Columbia; Cuerto & Barrada, Havana; Goiten A. Spol, Prague; E. Moreno Brandao, Curacao, Danish West Indies; N. E. Christensen, Copenhagen; Gustav Threne Steen, Oslo, Norway; J. M. Esteves de Aguiar, Braga, Portugal; Urrengochea & Ubarri, San Sebastian, Spain; Andrew Joseph, Port of Spain, Trinidad; J. A. Bustamante, Maracaibo, Venezuela; Elder Dempster & Co., Accra, West Africa.

Dill Doubles Capacity

CLEVELAND, June 28—Dill Mfg. Co., maker of tire valves and parts, has completed an addition to its plant here which will increase its floor space 75 per cent and double its production capacity.

Logangear Company Takes Over Kauffman

TOLEDO, June 28—The Logangear Co., with a capital of $140,000 of preferred stock and 6000 shares of no par common stock, will be incorporated here to take over the business of the former Kauffman Metal Products Co. with plants in Toledo and Bellefontaine.

Sales of the plant by receivers to Louis H. Gould, real estate dealer, for C. O. Miniger and associates, for $125,000 has been approved by Federal court here.

J. B. Nordholt, of the Toledo Steel Castings Co., will be president of the new company; L. H. Gould, vice-president; Attorney C. F. Chapman, secretary, and F. H. Landwehr, treasurer of the Electric Auto-Lite Co., treasurer.

The company will continue the manufacture of starting gears, tire rims, and other automotive accessories which have been manufactured by the former company.

Hudson Second Quarter Shows $3,311,314 Income

DETROIT, June 28—Net income of Hudson Motor Car Co. for the quarter ended May 31 is reported as $3,311,314, equivalent to $2.49 a share on the 1,330,050 shares of capital stock. Net income for the same quarter of 1925 was $5,968,783 or $4.52 a share. For the six months ended May 31, earnings were $6,057,337, equal to $4.55 a share. This compares with $9,795,715, or $7.42 a share, for the same period in 1924-25.

Australia Studies Automotive Needs

Stages First Transport Conference to Clear Way for Greater Development

MELBOURNE, AUSTRALIA, May 15 (*by mail*)—That no country in the world lends itself to development by the automotive vehicle more than Australia was brought home convincingly at the First Australian Transport Conference held in conjunction with the second International Motor Show at the Melbourne Exhibition Buildings. The display focused public attention upon the extensive growth of the motor industry within the commonwealth, and gave a marked stimulus to sales of all forms of automotive products.

In opening the transport conference, Prime Minister Bruce urged that full use should be made of all transport agencies. He pleaded for vision and the avoidance of wrangling. "Australia has an especially keen interest in the problem of transport," he said. "As a comparatively small people in charge of a very big country, it is of the utmost importance to us to do all we can to minimize the factor of distance, and to bring about the conveyance of passengers and the exchange and movement of goods across wide spaces as efficiently and as cheaply as possible."

In his paper "The Motor Vehicle in the United States," W. B. Schmidt, field representative of the National Automobile Chamber of Commerce, described the cooperation existing between manufacturers in the United States. He conveyed greetings from the United States motor industry to the conference and told of the scope of American business. In spending huge sums of money on motor transport America was economical and not extravagant, he declared. He detailed various phases of the industry in the United States, his address being followed with keen interest.

Rail and Motor Lines Cooperate

Motors and their relation to railway transportation in New Zealand were dealt with by H. L. Rogers (Wellington). "The Government," he said, "had introduced lower railway freights, but this did not improve the position over shorter routes. The authorities then cooperated with motor owners and had become successful where the haul exceeded 60 or 70 miles. The passenger side of motor transport was an active competitor of the railways," he said. Buses ran up to 200 miles and in districts where it would be impossible to construct railways owing to the nature of the country.

J. F. Cousins (New Zealand) told how the Government there consults motoring organizations regarding proposed legislation. Another New Zealand delegate, Ashcroft Edwards, referred to the road policy of the Dominion. Dr. W. A. Hargreaves, director of the South Australian State Department of Chemistry, in a paper on alternative motor fuels said it was unlikely that any form of manufactured product would be able to compete with petrol at the present cost of production. Lt. Col. H. C. Brinsmead, controller of civil aviation told of Australian aviation developments. H. W. Harrison was secretary of the conference.

Instalment Buying Counters Depression

CLEVELAND, July 1—Thomas Coughlin, well known Cleveland banker, has asserted that instalment purchases are an aid to prosperity and that automobile dealers have been a decisive factor in aiding prosperity with their deferred payment plans.

Mr. Coughlin, a strong adherent of the payment in instalment plan, asserts, however, that it must not be overdone. He suggests that credit men of the automobile companies extend their inquiries before approving applications for credit, so as to obtain information about how much of the applicant's salary is taken up with deferred payments.

Although many economists are regarding the saturation point in instalment buying near, Mr. Coughlin say there is little danger so long as there is no financial depression.

"Instalment buying itself is a counteraction against depression," said he. "More goods are bought than ever before and this helps all lines. The important problem for the merchant is to prevent his client from being overtaxed with obligations. If the purchaser's ability to pay is carefully studied there is little danger."

Canadian Exports Gain, Unit Valuation Lower

WASHINGTON, June 28—Automotive vehicle exports from Canada in 1925 totaled 58,005 units valued at $27,794,884, with an average value per unit of $479. Exports in 1924 totaled 43,883 units valued at $22,080,232 with an average value of $503. The ratio of exports to total production of 161,389 in 1925 was 45 per cent as against 42 per cent in 1924. Truck and bus exports from Canada in 1925 totaled 16,182, valued at $5,250,002, with an average unit value of $324. In 1924 the truck and bus export total was 12,772 units, valued at $4,429,161 with an average value of $347.

Tyree Opens New Plant

BLOOMINGTON, ILL., June 28—Tyree Auto Radiator Mfg. Co. has opened its new plant here and is gradually developing its operations to a capacity rate. The new plant combines eight buildings with a total manufacturing space of 66,000 sq. ft. The company plans to maintain a large reserve supply of its products to insure immediate shipping ability. The officers of the company are R. A. Tyree, president; P. E. Francis, vice-president, and W. W. Witmer, secretary and treasurer.

Rockford Companies Merged in New Firm

Sundstrand Machine Takes Over Former Tool and Milling Machine Companies

ROCKFORD, ILL., July 1—Consolidation of the Rockford Tool Co. and the Rockford Milling Machine Co. under the name Sundstrand Machine Tool Co. is effective today, manufacturing operations of the new company to be concentrated in the plant of the former Rockford Milling Machine Co. which is being enlarged. With new modern equipment and the introduction of a uniform manufacturing and production program the new company will have generally improved facilities for the handling of all products of the former companies.

Direction of the new company will be in the hands of H. L. Olsen, secretary and general manager, who has directed the affairs of the former companies since their organization. G. D. Sundstrand will continue as inventor and chief designer of the new company, with C. A. Sundstrand as his assistant. The engineering departments which have been operated separately will be departmentized and combined under one chief engineer.

The Rockford Tool Co. was organized in 1905, its first product being the 15-inch engine lathe. Later the Sundstrand tool room lathe and Sundstrand 16-inch single purpose lathe were added. These were followed by the 9-inch manufacturing lathes, the 12-inch manufacturing lathe, which was later discarded in favor of the stub lathe.

The Rockford Milling Machine Co. was organized in 1910 and the first milling machine product made was a No. 3 hand miller. From this has been developed a complete line of millers, the latest development being the Rockford Rigidmil. Practically the entire working force which started with the two companies are still with them and has participated in their upbuilding.

Republic Has Coast Plans

SEATTLE, WASH., June 26—Seattle is being considered as a site for a large truck assembling plant and distribution center for the Orient, Maurice Rothschild, chairman of the board of directors of the Republic Motor Truck Co., Inc., declared upon his arrival here this week.

With Mr. Rothschild were J. C. Haggart, vice-president, and R. H. Spencer of Los Angeles, Pacific Coast manager. The company already has established factory branches at Los Angeles, San Francisco and Portland.

Newell Offices Moved

CHICAGO, June 28—The R. B. Newell Co. has removed its offices here to the Garland building, 58 East Washington St.

Compulsory Sessions Scheduled by N.S.P.A.

DETROIT, June 30—The official program for the 1926 convention and show of the National Standard Parts Association, Nov. 15-19 in Hotel Sherman, Chicago, has been announced here by E. P. Chalfant, executive vice-president, in the form of a bulletin to members. It follows:

Nov. 15—Morning: Registration; attendance at show—not compulsory. Afternoon: First general session—compulsory; president's address; committee reports; prepared talks by members only. (Session open only to delegates and alternates.)

Nov. 16—Morning: Show attendance—compulsory. Afternoon: Show attendance—compulsory. (Show periods open for entire day to invited manufacturer and jobber guests.) Evening: Banquet —not compulsory. (Special show to be staged but no speeches.)

Nov. 17—Morning: Show attendance —compulsory. Afternoon: Second general session—compulsory; public speakers. (Session open to all invited guests.) Evening: Show attendance—not compulsory.

Nov. 18—Morning: Show attendance —compulsory. Afternoon: Division meetings—compulsory. Evening: Show attendance—not compulsory.

Nov. 19—Morning: Third general session—compulsory; reports of divisional meetings to be received; nominations for officers and directors; two prepared short papers by association members; open discussion of papers. Afternoon: 2 to 4 p. m.: Fourth and final business session —compulsory; election and installation of officers; closing addresses. 4 to 5.30 p. m.—not compulsory.

Coming Feature Issue of Chilton Class Journal Publication

Sept. 30—Automotive Industries Annual Production Issue

Applications for show space will be sent out about July 15 and drawings for space will be made Sept. 15. There will be 11,460 sq. ft. of floor space providing a minimum of 113 single booths.

Manufacturers Invited to Carolina Bus Meeting

CHARLOTTE, N. C., June 28—The North Carolina and South Carolina Bus Owners' Associations will meet in joint session here July 12-13, according to an announcement by John W. Hester, of Oxford, secretary of the North Carolina association.

Mr. Hester said the program will be completed within a few days. He added that representatives of the bus manufacturers, tire companies and gasoline and oil distributors will be guests of the associations at their sessions.

While Mr. Hester did not comment on this proposition, prominent operators here of bus lines said they felt encouraged to believe that a merger of the two state associations will be perfected at this convention.

Five hundred twenty-two motor buses on regular runs travel over 95,000 miles of highway in North Carolina each day, according to a statement here by John W. Hester, of Oxford, secretary of the North Carolina Bus Owners' Association. The operation expense is approximately $3,000,000 per year, he said.

Ford 3-Engine Plane Successful in Test

DETROIT, June 26—Following successful test flights of the new three-engined Stout all-metal commercial monoplane just completed by the Ford Motor Co., Col. Paul Henderson in his address before the Detroit Engineering Society announced the National Air Transport, Inc., has purchased one of the new triple-engined Ford planes for service on the N. A. T. air lines.

The new Ford plane powered with three 200 hp. Wright "Whirlwind" engines embodies several improvements in design over the original three-engined plane that was destroyed in the fire which wiped out the Stout Metal Airplane factory early this year. With eight men aboard and a full supply of gas and oil, the load carried on the flights are estimated at 1500 lb. With two engines operating the plane would climb, while with only one of the three power plants working, the plane would have a choice of landing fields within a radius of 45 miles from a reasonable altitude.

When his company, the National Air Transport, Inc., begins to carry passengers in addition to the present mails and freight cargoes, Colonel Henderson states 10-passenger planes will be used. In his statement he does not connect the purchase of the Ford plane with his entry into the passenger carrying business.

Naval Plane Bill Signed

WASHINGTON, June 26—A five-year building program for the Navy's air service was assured by the presidential signature this week upon the naval air service expansion bill authorizing the purchase of 1800 planes at a cost of $85,000,000.

Calendar of Coming Events

SHOWS

Batavia, Java .....July 31-Aug. 6
Exhibition, Botanical and Zoological Garden at Weltervreden.

Brussels .....Dec.

Buenos Aires .....Dec. 7-20
Ninth Argentine Automobile Show, Palermo Park.

Chicago .....Sept. 20-24
National Steel and Mechanical Tool Exposition, Municipal Pier, American Society for Steel Treating.

Chicago .....Nov. 8-13
Coliseum, Automotive Equipment Association.

Chicago .....Nov. 15-19
Hotel Sherman, National Standard Parts Association.

Chicago .....Jan. 29-Feb. 5
National, Coliseum, National Automobile Chamber of Commerce.

Cleveland .....Oct. 4-8
Public Auditorium and Annex, American Electric Railway Association.

Lima .....July 28
First Peruvian Automobile Show, Peruvian Touring Club.

London .....Oct. 4-9
Olympia Motor Cycle.

London .....Oct. 21-30

Milan .....Sept. 1-20
Exposition.

Milan .....Sept. 6-13
Fifth International Road Congress.

New Haven .....Sept. 7-10
Machine Tool Exhibition.

New York City .....Sept. 13-18
Madison Square Garden, Radio Manufacturers Show Association.

New York .....Jan. 8-15
National, Grand Central Palace, National Automobile Chamber of Commerce.

Paris .....Oct. 7-17
Auto Salon, Grand Palais.

Prague .....Sept.

CONVENTIONS

American Electric Railway Association, Public Auditorium and Annex, Cleveland .....Oct. 4-8

American Society for Steel Treating, Municipal Pier, Chicago.....Sept. 20-24

Associated Manufacturers of Fabric Auto Equipment, Inc., La Salle Hotel, Chicago .....Nov. 13

Automotive Equipment Association, Coliseum, Chicago .....Nov. 8-13

National Association of Automobile Show and Association Managers, Drake Hotel, Chicago .....July 27-28

National Standard Parts Association, Hotel Sherman, Chicago.....Nov. 15-19

National Tire Dealers Association, Inc., Memphis, Tenn. .....Nov. 16-18

S. A. E. MEETINGS

National

Boston, Nov. 16-18, National Transportation and Service.

Chicago, Sept. 21-23, Production Engineering, Hotel Sherman.

Philadelphia, Sept. 2-3, Aeronautical.

RACES

Altoona .....Sept. 6

Atlantic City .....July 17

Atlantic City .....Sept. 25

Charlotte, N. C. .....Aug. 23

Dallas, Texas .....Nov. 11

Laurel, Md. .....Oct. 23

Los Angeles .....Nov. 25

Salem, N. H. .....July 5

Salem, N. H. .....Oct. 12